Vol. 890 Number 4

OFFICIAL GAZETTE

of the UNITED STATES PATENT OFFICE

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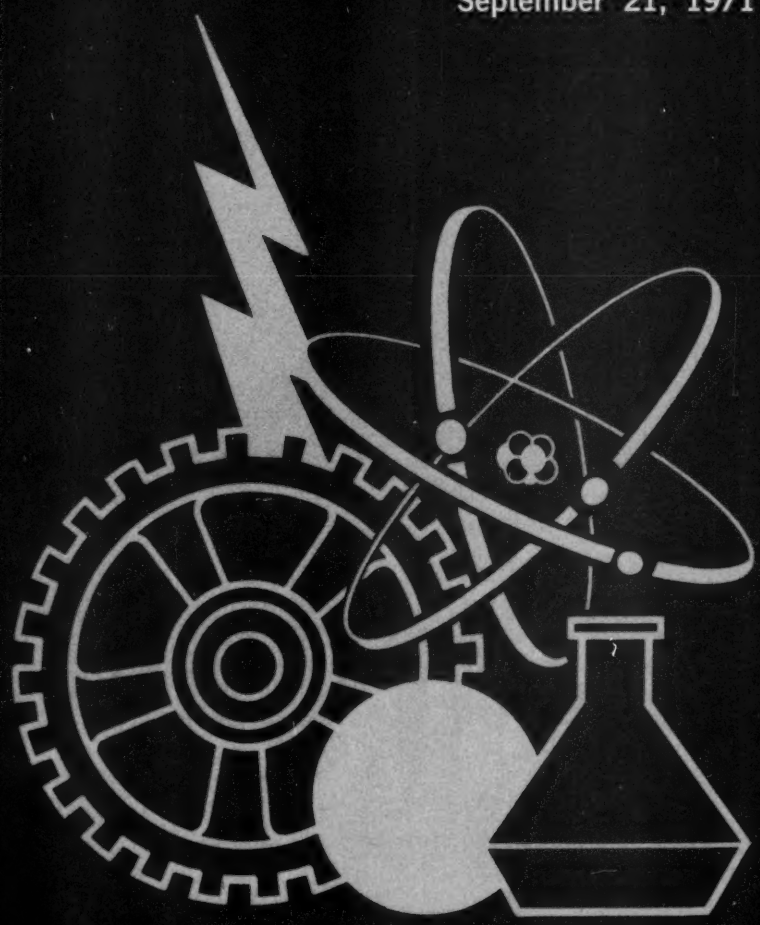
A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

PATENTS

September 21, 1971



U. S. DEPARTMENT OF COMMERCE

Patent Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

September 21, 1971 Volume 890 Number 4

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Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.O.

PATENT OFFICE NOTICES

Identification of Goods and Services in Trademark Applications

AMENDMENT

The notice entitled Identification of Goods and Services in Trademark Applications which appeared in the Federal Register of July 16, 1971 (36 F.R. 13232) and the OFFICIAL GAZETTE of Aug. 3, 1971, specified an incorrect method of payment for securing a copy of the English edition of "International Classification of Goods and Services to which Trademarks are Applied." Due to problems in international monetary exchange, the British Patent Office no longer accepts an ordinary check drawn on an American bank in dollars. The paragraphs in the identified notice relating to methods of payment (the last two paragraphs and concluding table) should read as follows:

We have been advised by the British Patent Office that the only acceptable methods of payment are by International Money Order or banker's draft, payable in sterling and drawn on a bank in the United Kingdom. Orders for the International Classification and for the supplements can be made by remittance in the following amount(s):

International Classification	50 pence
Nov. 15, 1967, supplement	5 pence
Mar. 18, 1970, supplement	Free
Mar. 3, 1971, supplement	10 pence
Total cost (including postage by surface mail)	65 pence
Additional charge for postage by air mail	1 pound 55 pence
Total cost by airmail	2 pounds 20 pence

Orders should be sent directly to:

Sales Branch, The Patent Office, Block C.
Station Square House, St. Mary Cray,
Orpington, Kent, England

RENE D. TEGTMEYER,
Assistant Commissioner for Appeals, Legislation and Trademarks.

Date: Aug. 27, 1971.

Pub. 36 F.R. 17591; Sept. 2, 1971

Certificates of Correction for the Week of Sept. 21, 1971

D. 220,337	3,560,744	3,576,764
Re. 27,124	3,561,628	3,577,031
Re. 27,125	3,561,754	3,577,175
Re. 27,151	3,562,730	3,577,279
3,500,714	3,563,750	3,577,786
3,529,756	3,563,951	3,577,883
3,530,319	3,564,836	3,579,192
3,542,046	3,565,630	3,579,282
3,545,587	3,566,886	3,579,364
3,546,083	3,570,511	3,579,494
3,553,307	3,570,547	3,579,534
3,555,054	3,570,624	3,579,944
3,555,207	3,570,725	3,580,067
3,555,709	3,573,952	3,581,378
3,556,663	3,574,641	3,581,394
3,556,940	3,574,692	3,881,624
3,558,113	3,574,821	3,581,844
3,558,649	3,575,492	3,582,399
3,560,064	3,575,972	3,583,145
3,560,142	3,576,150	3,583,583
3,560,440	3,576,584	3,585,018

PATENTS AND TRADEMARKS

Relief in Cases Affected by the Postal Emergency of March 1970

On June 30, 1971, President Nixon signed into law Public Law 92–34.

Public Law 92–34 requires claims for the benefit of an earlier filing date (Section 1.) and requests for such other relief as may be appropriate (Sec. 2.) to be filed in the Patent Office within 6 months after enactment, that is by December 30, 1971. Failure to file a statement within the noted period will result in loss of right to take advantage of the benefits of the law. Further explanation or evidence may be required at a subsequent time. Public Law 92–34 provides relief only for situations caused by the postal emergency which began on March 18, 1970, and ended on or about March 30, 1970, and for which there is no remedy under existing law.

The following explanation is designed to serve as a guide for persons desiring relief under the law.

The verified statement required to be filed under sections 1 and 2 of the law may be by any of the following:

(a) Applicant(s) for patent or trademark registration;
(b) Patentee(s) or trademark registrant;
(c) Owner(s) of record.

In cases involving plural inventors, statements made under (a) or (b) must be signed by all inventors.

The verified statement must specify the particular earlier date of receipt in the Patent Office to which the applicant, patentee or trademark registrant, or owner of record believes his application, fee or other paper would be entitled except for the delay caused by the postal emergency of March, 1970. The statement must be verified, that is, in the form of an oath or declaration. (37 CFR 1.68 (Patent Rule 68) and 2.20 (Trademark Rule 2.20).)

Evidence will not normally be required or considered by the Patent Office regarding a claimed filing date of March 18, 1970, or later, in applications actually filed before June 1, 1970. Claims for earlier filing dates in cases actually filed after June 1, 1970, or claiming a date prior to March 18, 1970, will be considered prima facie unreasonable unless an acceptable explanation of the basis for the claim is filed in the Patent Office with the claim or within 1 month or such longer time as may be prescribed by the Commissioner. Any claim not accepted by the Patent Office because it is obviously defective on its face or unreasonable may be subjected to further review by petition to the Commissioner.

The statement should adequately identify the involved application, patent, or trademark registration by including the name of the applicant, patentee or registrant, title of the invention or an identification of the mark, serial number, filing date, group art unit number and any other identifying data such as status of the case (e.g., awaiting first action, amendment, brief, etc.). Acceptable statements will be acknowledged, made of record and retained in the Patent Office files.

When practical, earlier filing dates accorded under this law, as well as the originally granted filing dates, will be identified on ensuing patents and trademark registrations. These dates will also be included in the OFFICIAL GAZETTE in connection with patents, trademark registrations and trademarks published for opposition. In other cases, such as applications in issue prior to filing of a claim, the patent or trademark registration number and claimed filing dates will be published in the OFFICIAL GAZETTE after December 30, 1971.

Patents issued with earlier filing dates afforded by this law will not be effective as prior art as of such earlier filing dates under subsection 102(e) of title 35 of the United States Code.

In a pending patent application in which a claim for an earlier filing date has been acknowledged under this law, applicants need not file a Rule 131 affidavit to overcome a reference having an effective filing date between the "earlier" and the actual filing date of the application. Intervening references of this type will be cited but not applied by the examiner. Although a statement claiming an earlier date is accepted by the Patent Office, the claimed earlier date may be called into question in subsequent inter partes proceeding in the Patent Office or in the courts. In these proceedings, the applicant or owner may be required to present further evidence establishing the filing date to which the application is entitled. In such cases a definite determination shall be made as to whether the applicant is entitled to the earlier date under the law.

In cases where a patent application or an application for registration or late renewal of a trademark is determined to have become abandoned for failure to meet a statutory time limit because of the postal emergency, the application will automatically be restored to pending status by the acceptance of the request, and prosecution or other processing of the application will be resumed. Similarly, if a trademark registration is determined to have been cancelled for failure to meet the statuory time limit within which to file the affidavit required under section 8 of the Trademark Act (15 U.S.C. 1058a) because of the said emergency, the order for cancellation will be rescinded.

As explained in the notice of January 26, 1971 (882 O.G. 1342), applicants who may be entitled to earlier filing dates should note that a change in their U.S. filing date might, in turn, alter the date of expiration of the 6- and 12-month periods for filing applications abroad under provisions of the Paris Convention for the Protection of Industrial Property.

WILLIAM E. SCHUYLER, JR.,
Commissioner of Patents.

Dated: July 14, 1971.

JAMES H. WAKELIN, JR.,
Assistant Secretary for Science and Technology.

[FR Doc. 71–10469; Filed 7–22–71; 8:52 am]

36 F.R. 13694; July 23, 1971

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
F. H. BRONAUGH, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 7, 1971

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	5-05-70
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	3-09-70
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	7-20-70
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. P. KENT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-03-70
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—W. B. KNIGHT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	4-01-70
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Miscellaneous.	12-29-70
SECURITY, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-31-70
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	7-14-70
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	8-21-70
PHYSICS, GROUP 280—R. L. EVANS, Director. Photography; Sound and Lighting; Indicators and Optics; Measuring and Testing; Geometrical Instruments.	5-14-70
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	8-17-70
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Railways and Railway Equipment; Brakes; Rigid Flexible and Special Receptacles and Packages.	7-06-70
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders Woodworking; Tools; Cutlery; Jacks.	5-15-70
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	6-04-70
HEAT, POWER AND FLUID ENGINEERING, GROUP 340—C. F. GAREAU, Director. Power Plants; Combustion Engines; Fluid Motors; Pumps; Turbines; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Vaporizing; Temperature and Humidity Regulation; Machine Elements; Power Transmission; Fluid Handling; Lubrication; Joint Packing.	9-14-70
CONSTRUCTIONS, SUPPORTS, TEXTILES, CLEANING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Receptacles; Supports; Cabinet Structures; Centrifugal Separations; Cleaning; Coating; Pressing; Agitating; Foods; Textiles; Apparel and Shoes; Sewing Machines; Winding and Reeling.	7-27-70

Expiration of patents: The patents within the range of numbers indicated below expire during September 1971, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... **Numbers 2,688,133 to 2,690,559, inclusive**
Plant Patents..... **Numbers 1,300 to 1,307, inclusive**

DEFENSIVE PUBLICATIONS

PUBLISHED SEPTEMBER 21, 1971

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent Office makes no assertion as to the novelty of the disclosed subject matter.

T890,001
PROCESS FOR THE QUANTITATIVE DETERMINATION OF THE PRESENCE OF PHENOLICS

Charles Eugene Hamilton, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sept. 19, 1969, Ser. No. 859,573
Int. Cl. G01n *33/18*
U.S. Cl. 23—230R
No Drawing. 5 Pages Specification

Method of quantitatively determining the presence of phenolic compounds having an open para-ring position by contacting them with 2,6-dibromoquinone chlorimide at a pH of from 8.5 to 10.5 to form a dibromoindophenol dye. In the known process, the dye is analyzed colorimetrically to determine the concentration of the phenolic in the solution. The improvement comprises contacting the reactants at a temperature within the range from 45° to 50° controlled to ±0.5° C. By carrying out the reaction within this temperature range, the formation of the dibromoindophenol dye takes place in less than 1 hour as compared to a reaction time of as high as 24 hours at room temperature. Reaction times as short as 15 minutes are possible at temperatures within the range of 50±0.1° C.

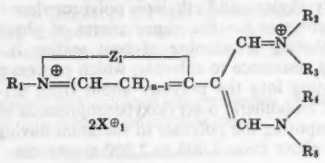
T890,002
PREPARATION OF ALLYLIDENE AND BISALDEHYDE DYE INTERMEDIATES AND CORRESPONDING PHOTOGRAPHIC DYESTUFFS

John R. Owen, 1999 Lake Ave., Rochester, N.Y. 14650

Filed Mar. 26, 1970, Ser. No. 23,011
Int. Cl. C09b *23/00*
U.S. Cl. 260—240.1
No Drawing. 25 Pages Specification

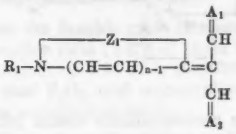
A novel process is provided for preparing substituted allylidene dye intermediate having the formula:

(I)



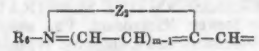
wherein R_1 represents alkyl, alkenyl or aryl, R_2, R_3, R_4 and R_5 each may be the same or different and represent alkyl, Z_1 represents the nonmetallic atoms required to complete a heterocyclic nucleus of the type used in photographic spectral sensitizing and desensitizing dyes containing from 5 to 6 atoms in the heterocyclic ring which nucleus can contain a second hetero atom such as oxygen, nitrogen, selenium, or sulfur and may contain one or more fused rings, *n* represents a positive integer from 1 to 2 and X represents an acid anion. The above allylidene dye intermediates may be used directly to prepare spectral sensitizing dyes or may be first hydrolyzed to the corresponding bisaldehyde which may then be used to prepare spectral sensitizing dyes having the formula:

(II)



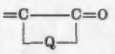
wherein R_1, Z_1 and *n* are as defined above, A_1 and A_2 may be the same or different and represent oxygen, nuclei having the following formula:

(III)



wherein R_6 represents alkyl, alkenyl or aryl, *m* represents a positive integer of from 1 to 2 and Z_2 is as defined for Z_1 above, or nuclei having the formula:

(IV)



wherein Q represents the nonmetallic atoms required to complete a heterocyclic nucleus containing 5 to 6 atoms in the heterocyclic ring, which ring preferably contains from 3 to 4 carbon atoms, 1 nitrogen atom and 1 atom selected from the group consisting of nitrogen, oxygen and sulfur. An example of the preparation of an allylidene dye intermediate by the process disclosed is the preparation of 3 - dimethylamino - 2 -(2 - benzothiazolylmethoperchlorate)allylidene dimethylammonium perchlorate which comprises reacting (a) 2,3 - dimethylbenzothiazolium p-toluenesulfonate with (b) the complex formed by the reaction of phosphorous oxychloride with N,N-dimethylformamide. An example of the preparation of a spectral sensitizing dye by the process of the disclosure is the preparation of 2-bis-(1,3-diethyl-2,4,6-trioxohexahydropyrimidinylidenemethyl)methylene - 3 - methylbenzoxazoline which comprises: (1) reacting (a) 3-ethyl-2-methylbenzoxazolium iodide with (b) the complex formed by the reaction of phosphorous oxychloride with N,N-dimethylformamide to form the intermediate 3-dimethylamino-2-(2-benzoxazolyl ethoperchlorate)allylidene dimethylammonium perchlorate; and (2) reacting said intermediate with 1,3-diethylbarbituric acid.

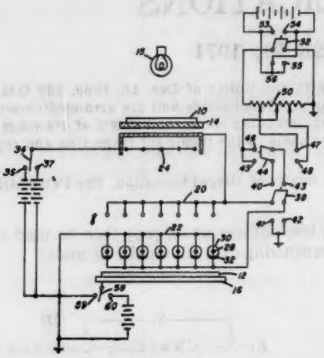
T890,003
LATITUDE IN PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING

Joseph Y. Kaukeinen, Kodak Park Works, Rochester, N.Y. 14650

Filed May 4, 1970, Ser. No. 34,286
Int. Cl. G03g *13/00*
U.S. Cl. 250—49.52C
1 Sheet Drawing. 12 Pages Specification

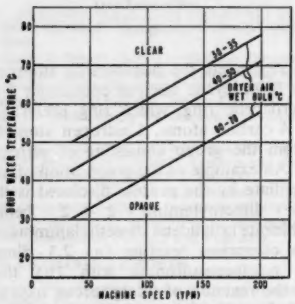
A metal coating is applied to one side of the photoconductor coated grid used to control corona charging.

The coating is applied to the side which is not directly exposed to the incident radiation and serves to reduce dis-



charge of the photoconductor coated grid caused by reflection of diffuse radiation from the copy receiving sheet.

T890,004
COALESCENCE OF COATINGS ON THERMOSENSITIVE SUBSTRATES
Larry Eugene Seever, Richmond, Va., assginor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed May 20, 1970, Ser. No. 38,927
Int. Cl. B44d *1/48*
U.S. Cl. 117—119.6
1 Sheet Drawing. 10 Pages Specification



In a continuous process for coating a thermosensitive thermoplastic substrate such as film prepared from polyesters, polyolefins, vinyl acetate polymers and vinylidene chloride polymers with a coalescible coating material such as a 10–65 weight percent dispersion of vinylidene chloride and vinylidene chloride copolymerized with methyl acrylate, acrylic acid, methyl methacrylate, acrylonitrile and methacrylic acid in which an aqueous dispersion of the coating material is applied to the substrate and dried by the evaporation of the aqueous vehicle with heated air, the improvement which comprises:

(a) Determining the wet bulb temperature of heated drying air and the coalescence temperature of the coating material and

(b) Increasing the wet bulb temperature of the heated air to at least the coalescence temperature of the coating material. Preferably, the wet bulb temperature of the heated air is increased by an increment sufficient to raise the temperature of the coating to at least the minimum coalescence temperature of coating material during the drying cycle and more preferably, this increase is at least about 20 centigrade degrees above the coalescence temperature of the coating material.

The improved drying process of this invention can be incorporated into conventional drying apparatus such as drum dryers, arch dryers, or floater dryers in which the film is unsupported during drying, and the wet bulb temperature is conveniently increased by the addition of steam to the drying air.

T890,005
SYNTHESIS OF 1,12-DODECANEDIOIC ACID TO REDUCE LEVEL OF MONOBASIC ACID IMPURITIES
John Ejnar Fallon, Wilmington, Del., and Thomas Whitfield Wilson, Glassboro, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation of application Ser. No. 569,815, Aug. 3, 1966. This application June 12, 1970, Ser. No. 45,943
Int. Cl. C07c *55/04*
U.S. Cl. 260—533C
No Drawing. 10 Pages Specification

In a process for the oxidation of cyclododecane to 1,12-dodecanedioic acid comprising the steps of oxidizing cyclododecane with oxygen to an initial oxidate mixture comprising cyclododecanol and cyclododecanone, distilling to remove volatile materials including by-products and uncovered cyclododecane from the mixture, oxidizing the resulting cyclododecanol/cyclododecanone mixture with nitric acid to form 1,12-dodecanedioic acid, and recovering 1,12-dodecanedioic acid, the additional step of washing the initial oxidate with an aqueous solution of sodium hydroxide, potassium hydroxide, ammonium hydroxide, or calcium hydroxide at a temperature in the range of 120–230° C. to reduce the amount of monobasic acid impurities therein, said additional step being conducted between the steps of oxidizing cyclododecane with oxygen and oxidizing the cyclododecanol/cyclododecanone mixture with nitric acid, i.e., either before or after the distillation step.

T890,006
MONOMERIC PHOTOSENSITIZERS
Fulton Floyd Rogers, Jr., Richmond, Va., and Allen G. Kirk, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation of application Ser. No. 851,722, Aug. 20, 1969. This application June 18, 1970, Ser. No. 48,915
Int. Cl. B01j *1/00;* **C08d** *1/00*
U.S. Cl. 204—159.15
No Drawing. 9 Pages Specification

A process for photocrosslinking polymers selected from polypropylene, ethylene/sulfur dioxide copolymer, natural rubber, styrene-butadiene copolymer, chlorosulfonated polyethylene and ethylene/polypropylene/1,4-hexadiene terpolymer for the improvement of physical properties including broadening of heat sealing ranges, and increasing resistance to solvents; which process comprises incorporating into the polymer about from 0.1–10% by weight of monomeric p-acryloxybenzophenone and subsequently exposing the polymer to radiation having a wavelength of about from 2,000 to 7,000 angstroms.

T890,007
CHLORINATED CARBOXYL GROUP CONTAINING RUBBERS
Paul D. Folzenlogen, Windell C. Watkins, and Hugh J. Hagemeyer, Jr., all of P.O. Box 2068, Longview, Tex. 75603
Continuation of application Ser. No. 819,112, Apr. 24, 1969. This application Sept. 21, 1970, Ser. No. 74,231
Int. Cl. C08c *5/02;* **C08d** *5/04;* **C08f** *27/03*
U.S. Cl. 260—78.4D
No Drawing. 12 Pages Specification

This invention relates to chlorinated carboxyl group containing rubbers which can be prepared by chlorinating

a carboxyl group containing rubber. These rubbers are useful in forming coating compositions which have excellent adhesion to substrates such as metal, wood, and concrete.

T890,008

SULFUR DIOXIDE RECOVERY FROM STACK GASES EMPLOYING OXIDATION INHIBITOR

Archie V. Slack, Wilson Lake Shores, Sheffield, Ala. 35660, and John M. Potts, 1010 Linwood Ave., Florence, Ala. 35630

Filed Oct. 7, 1970, Ser. No. 78,662
Int. Cl. B01d *47/00, 47/02*
U.S. Cl. 23—2SQ
2 Sheets Drawing. 16 Pages Specification

An improved process for scrubbing power plant stack gas with lime or limestone slurries to remove sulfur oxides which consists of feeding lime or limestone along with recycle liquor and makeup water to a delay tank; circulating the slurry formed through a gas scrubber to remove sulfur dioxide from stack gas; advancing slurry equivalent to that made in the above delay tank countercurrent to the gas and using it in another scrubbing stage or stages; removing a similar amount of slurry from this scrubbing stage and separating solids and calcining them to produce usable sulfur dioxide; returning separated liquor to scrubbing circuit; and reusing calcined solids in scrubbing circuit for removal of sulfur dioxide. Oxidation inhibitor is added to keep the sulfur in easily regenerable calcium sulfite form. The calcium sulfite is heated to drive off sulfur dioxide for sulfuric acid manufacture and simultaneously regenerate lime for reuse in scrubbing stack gas. Unwanted calcium sulfate unavoidably formed is coarser than calcium sulfite or regenerated lime and is separated by size classification and discarded. Fly ash, if present, can be removed ahead of the sulfur dioxide scrubbers by wet scrubbers or electrostatic precipitators.

T890,009

COATING COMPOSITIONS CONTAINING TITANIUM DIOXIDE FLUX-CALCINED DIATOMACEOUS EARTH AND A BUTADIENE/METHYL METHACRYLATE/METHACRYLIC ACID TERPOLYMER

Achim R. Krueger, Upper Darby, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of application Ser. No. 832,826, June 12, 1969, which is a continuation-in-part of application Ser. No. 539,321, Apr. 1, 1966. This application Oct. 21, 1970, Ser. No. 82,807
Int. Cl. C09d *5/02*
U.S. Cl. 260—29.7
No Drawing. 8 Pages Specification

A coating composition comprising water, a butadiene/methyl methacrylate/methacrylic acid terpolymer, and a pigment of

(a) particulate flux-calcined diatomaceous earth, and
(b) particulate rutile titanium dioxide.

T890,010

STABILIZATION OF POLYPHOSPHATE FERTILIZER SOLUTIONS BY FLUORIDES OR FLUOSILICATES

Alva W. Frazier, 2219 Randolph St., Florence, Ala. 35630

Continuation-in-part of application Ser. No. 30,264, Apr. 20, 1970. This application Oct. 21, 1970, Ser. No. 82,809
Int. Cl. C05b *7/00, 13/06*
U.S. Cl. 71—34
No Drawing. 22 Pages Specification

Wet-process phosphoric acids contain metallic impurities—mostly magnesium, aluminum, and iron—dissolved in the acidulation of the parent phosphate rock. Ammonium polyphosphate fertilizer solutions prepared therefrom deposit sludges of phosphates of the metallic impurities that interfere seriously with mechanical handling of the liquids. Formation of the sludges can be prevented, however, by addition of fluorine as either fluoride or fluosilicate.

A minor excess of fluoride over that required to form the most common sludge phase, water-insoluble salt

$$MgAl(NH_4)_5(P_2O_7)_2F_2 \cdot 6H_2O$$

in ammonium and potassium polyphosphate liquid fertilizer solutions prevents the precipitation of these metallic impurities. The precipitation of less common solid phases such as $Mg(NH_4)_2P_2O_7 \cdot 4H_2O$,

$$Al(NH_4)_2P_2O_7OH \cdot 3H_2O$$

and

$$Mg(NH_4)_6(P_2O_7)_2 \cdot 6H_2O$$

is prevented when the fluoride concentration is increased to give a sequestration ratio (S.R.) of about 0.5 at a 50% polyphosphate content or 0.14 at a polyphosphate value of 10% of the total P_2O_5, said sequestration ratio being determined by the empirical equation:

$$S.R. = \frac{\text{Wt. percent F}}{\text{Wt. percent MgO} + 3 \text{ wt. percent } Al_2O_3 + 0.33 \text{ wt. percent } Fe_2O_3}$$

Effectively, this increase in fluoride content shifts the solution composition from a region of stability for these insoluble salts to a region where water-soluble compounds, such as dimorph II of $MgAl(NH_4)_5(P_2O_7)_2F_2 \cdot 6H_2O$, are the stable phases, thus sequestering the metallic cations.

T890,011

TRILOBAL NYLON FILAMENTS CONTAINING POLY(ALKYLENE ETHER)

Ashok J. Champaneria, 402 William St., Seaford, Del. 19973; Thomas P. Doherty, 3321 Rockfield Drive N., Devonshire, Wilmington, Del. 19810; and Robert R. Moneymaker, 43 Read St., Seaford, Del. 199873

Filed Oct. 26, 1970, Ser. No. 84,242
Int. Cl. D02g *3/22*
U.S. Cl. 161—174
No Drawing. 5 Pages Specification

Synthetic trilobal filaments with a modification ratio of 1.55 to 1.75 containing 3 to 8% by weight of a high molecular weight, water-soluble poly(alkylene ether) are soil-resistant and have a reduced tendency to change color when wet. Preferably, the filaments are nylon and have a tip radius of 0.3 to 0.5; the preferred poly(alkylene ether) is poly(ethylene ether) glycol.

T890,012

STABILIZATION OF POLYPHOSPHATE FLUID FERTILIZERS BY OXIDIZING AGENTS

Alva W. Frazier, 2219 Randolph St., Florence, Ala. 35630

Filed Dec. 23, 1970, Ser. No. 101,094
Int. Cl. C05b *7/00, 13/06*
U.S. Cl. 71—34
No Drawing. 14 Pages Specification

Very small quantities of ferrous iron, i.e., about 0.4 percent, can result in 20 to 25 percent sludge fraction in ammonium and potassium polyphosphate liquid fertilizers even after 1–2 weeks of storage, whereas ferric iron can attain concentrations up to 4.0 percent without the formation of sludge constituents. It has been discovered that treating the wet-process phosphoric acid with a very minor quantity (usually about 0.3 percent) of ammonium nitrate while the acid is warm (about 60° C.) will convert the iron to the ferric state and prevent the undesirable sludge formation of $Fe(NH_4,K)_2P_2O_7 \cdot 2H_2O$. Other ni-

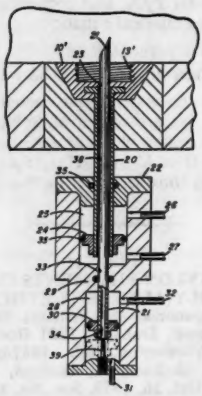
trate sources which may be utilized as oxidizing agents are $NaNO_3$ or KNO_3.

Common oxidizing agents such as permanganates, dichromates, peroxides, chlorites, hypochlorites, and others are equally effective but are not as inexpensive and unique as ammonium nitrate which is not usually considered as an oxidizing agent. The requirement for this treatment and quantity of ammonium nitrate needed can be readily determined by a simple titration of the acid using a standardized potassium permanganate solution.

T890,013
APPARATUS FOR BLOW MOLDING UNDERCUT ARTICLES

Ray H. Lawrence, West Henrietta, N.Y. (1669 Lake Ave., Rochester, N.Y. 14650)

Filed Feb. 1, 1971, Ser. No. 111,383
Int. Cl. B29d *23/03*
U.S. Cl. 18—5BB
1 Sheet Drawing. 11 Pages Specification

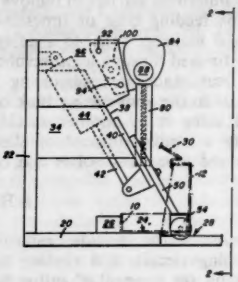


An apparatus for use in the blow molding of articles having undercut portions, such as neck threads. The undercut portion is cooperatively molded by means of sector-shaped inserts mounted on mutually inclined slideways formed in one of the mold halves. Sliding movement in one direction causes the inserts to merge and form a mold for the undercut portion, while movement in the opposite direction separates the inserts from the finished article. The inserts are centrally engaged and driven by a hollow actuator rod which is itself reciprocally driven by a piston in one chamber of a double-chambered fluid pressure cylinder. A blow pin, reciprocally driven by a piston in the other chamber, is slidably received within the actuator rod for movement independent thereof. The blow pin is also freely movable at all times with respect to the inserts since, depending upon the position of the inserts, the pin may pass either through a cooperatively formed aperture or between the separated inserts. A stationary plug seals the blow pin at its trailing end and prevents premature blowing by restricting the entry of blowing fluid into the pin until the pin has moved forward a sufficient distance to pierce the parison.

T890,014
HORIZONTAL EYELETER

Eugene Lemieux, Albion, and Kenneth N. Ross and Hendrik Vandermeulen, Rochester, N.Y. (all of 1669 Lake Ave., Rochester, N.Y. 14650)

Filed Mar. 1, 1971, Ser. No. 120,012
Int. Cl. B21j *15/02, 15/14*
U.S. Cl. 29—526
2 Sheets Drawing. 17 Pages Specification



Method and apparatus for horizontally inserting eyelets comprising a horizontally operable ram member having a horizontally disposed spindle at one end thereof. An anvil member is arranged in horizontal spaced alignment with the spindle. The ram member and the anvil member are mounted on a frame member arranged for movement between a first retracted position and a second fastener-setting position in a direction transverse to the horizontal motion of the ram member, with the ram member and the anvil member being maintained in alignment throughout their movement between the first and second positions. An eyelet supply means, including a track means, extends between the ram member and the anvil member when they are in the first position with the track means arranged to present an eyelet in alignment with the spindle. The eyelet supply means is arranged to horizontally move the track means toward the ram member to engage the eyelet in the track means with the spindle, and then to return the track means to the original position when the ram member and the anvil member are in the second position. The track member is arranged to release the eyelet engaged by said spindle upon movement of the spindle towards the second position. The ram member and the anvil member are disposed on opposite sides of the article when they are in the second position. The ram member is then driven toward the anvil member to drive the spindle and the eyelet through the article and to impact the eyelet on the anvil member to set the eyelet in the article. The ram member and spindle are then retracted from the anvil member and the ram member and anvil member are returned to the first position.

REISSUES

SEPTEMBER 21, 1971

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

27,174

RECLOSABLE BAGS WITH RIB AND GROOVE ELEMENTS FORMED OF DIFFERENT MATERIALS

Steven Ausnit, 124 E. 61st St., New York, N.Y. 10021

Original No. 3,371,696, dated Mar. 5, 1968, Ser. No. 500,652, Oct. 22, 1965. Application for reissue Jan. 23, 1970, Ser. No. 5,293

Int. Cl. B65d *33/24*

U.S. Cl. 150—3 10 Claims

A sheet with an integral flexible closure including a plastic film with raised integral rib and groove elements thereon shaped for releasably interlockingly joining each other and the plastic film formed of a thermoplastic having a first physical property and the rib and groove elements formed of a thermoplastic having a second different physical property.

27,175

PRINT HAMMER UNIT FOR HIGH SPEED PRINTERS

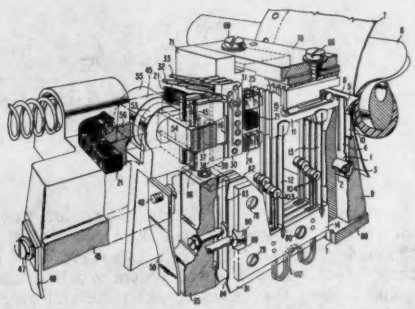
Sieghard Arnold, Hildrizhausen, Gerold Buhrmann, Stuttgart, Jurgen Haasis, Boblingen, Horst Heinrich, Berlin, Manfred Nitschke, Stuttgart-Rohr, Gunter Schacht, Boblingen, and Eberhard Spieth, Holzgerlingen, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Original No. 3,359,921, dated Dec. 26, 1967, Ser. No. 473,093, July 19, 1965. Application for reissue Apr. 29, 1968, Ser. No. 728,093

Claims priority, application Germany, July 25, 1964, J 26,273

Int. Cl. B41j *9/00*; B23p *19/00*

U.S. Cl. 101—93 20 Claims



Printing apparatus for a high speed printer having an elongated print hammer with an upstanding armature portion at the end remote from the print line and a pair of parallel flat springs supporting the print hammer. An electromagnet having a hold winding for producing magnetic flux to hold the print hammer in a retracted position and means for reducing the magnetic flux below the holding value to permit the support springs to actuate the hammer to a printing position.

27,176

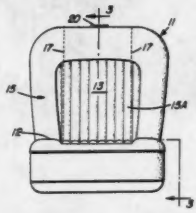
ORTHOPEDIC SEAT SUPPORT

Edward Froelich, 5408 Eastview Park, Chicago, Ill. 60615

Original No. 3,321,241, dated May 23, 1967, Ser. No. 558,719, June 20, 1966, which is a continuation-in-part of Ser. No. 463,237, June 11, 1965. Application for reissue May 16, 1968, Ser. No. 731,362

Int. Cl. A47c *3/00*

U.S. Cl. 297—284 4 Claims



Seat back with vertically adjustable contoured orthopedic element or device. The back comprises an inner core with an outer cover therefor, a fabric portion being intermediate cover and core and secured to the cover by spaced parallel stitching to form a pocket to accommodate the orthopedic element. Provision is made by means attached to the orthopedic element and extending through an aperture provided in the outer cover for vertically adjusting the orthopedic device to a desired position and removably securing the same in such position.

27,177

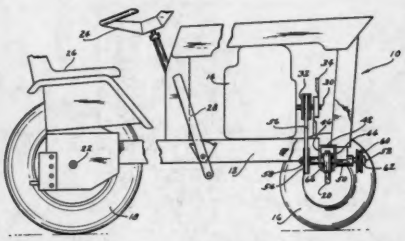
FRONT AXLE AND PTO SHAFT

William J. Schlapman and Elmer E. Croisant, Winneconne, Wis., assignors to J. I. Case Company, Racine, Wis.

Original No. 3,349,631, dated Oct. 31, 1967, Ser. No. 528,924, Feb. 21, 1966. Application for reissue Dec. 13, 1968, Ser. No. 786,503

Int. Cl. F16h *37/00*

U.S. Cl. 74—15.63 13 Claims



A power take-off drive for a tractor including a power take-off shaft at the front end of the tractor that is rotat-

ably mounted in an axle assembly. The axle assembly is mounted for pivotal movement relative to a U-shaped support bracket, which is secured to the frame of the tractor. The power take-off shaft is rotated through a drive train including a sheave on the tractor crankshaft, a sheave on the power take-off shaft, and a belt interconnecting the sheaves.

27,178

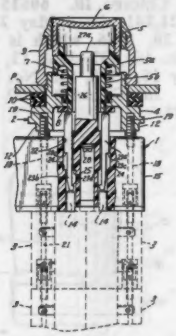
LIGHT MODULE AND COMBINATION THEREOF WITH PUSH BUTTON OPERATOR AND SWITCH

Richard C. Rothweiler, Asheville, N.C., and Josef Bierenfeld, Shorewood, and Carl B. Sohns, Whitefish Bay, Wis., assignors to Square D Company, Park Ridge, Ill.

Original No. 3,315,060, dated Apr. 18, 1967, Ser. No. 506,696, Nov. 8, 1965. Application for reissue Feb. 19, 1970, Ser. No. 12,872

Int. Cl. H01h *9/18*

U.S. Cl. 200—167A **8 Claims**



A light module for an illuminated pushbutton type electrical switching unit. The module is arranged to be mounted between an illuminated pushbutton type operator and one or more switch units and includes passages which receive pins to transmit movements of the operator to the switches and an internal cavity which receives a transformer or resistors so that the voltage of the supply for the switching unit is made compatible with the requirements of the lamp which is positioned by the module to illuminate the pushbutton.

27,179

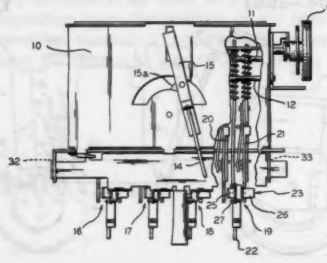
TUNER ACTUATING MECHANISM

Gilead H. Newman, Des Plaines, Ill., assignor to TRW Inc., Cleveland, Ohio

Original No. 3,357,264, dated Dec. 12, 1967, Ser. No. 522,433, Jan. 24, 1966. Application for reissue Apr. 29, 1969, Ser. No. 830,553

Int. Cl. F16h *35/18*

U.S. Cl. 74—10.27 **7 Claims**



A pushbutton slide is selectively engageable with one or the other of an actuating device on each side of the slide. A toggle lever carried by the slide is movable into engagement with the selected actuating device to render the same operational.

27,180

IMPRINTING AND OBLITERATING APPARATUS

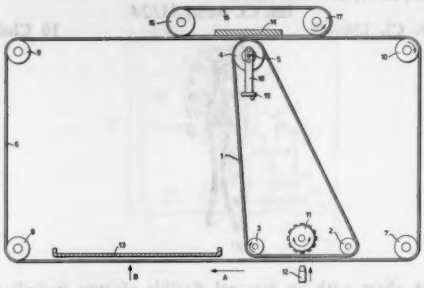
Victor Spreter, Geneva, and Max Schonfelder, Petit-Lancy, Geneva, Switzerland, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Original No. 3,421,611, dated Jan. 14, 1969, Ser. No. 563,130, July 6, 1966. Application for reissue May 11, 1970, Ser. No. 36,193

Claims priority, application Switzerland, July 8, 1965, 9,692/65

Int. Cl. B41z *1/32*

U.S. Cl. 197—49 **9 Claims**



A printing device is provided which ink prints with a non-diffusible endless inking ribbon onto an endless plastic band of polyester resin, such as polyethylene terephthalate, and then at a later station, after passing reading position, rubs the same inking ribbon over the plastic band to effect obliteration and reabsorption of the ink imprint back onto the inking ribbon.

27,181

MANUFACTURE OF OIL-FILLED ELECTRIC CABLES

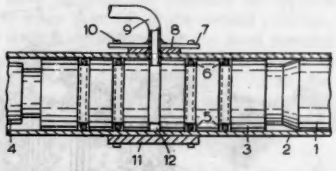
Maurice Dudley Lambert, Fairoak, Eastleigh, England, assignor to Pirelli General Cable Works Limited, London, England

Original No. 3,455,347, dated July 15, 1969, Ser. No. 506,209, Nov. 3, 1965. Application for reissue Feb. 24, 1970, Ser. No. 13,740

Claims priority, application Great Britain, Nov. 5, 1964, 45,115/64

Int. Cl. B65b *31/04, 1/04*

U.S. Cl. 141—65 **4 Claims**



In evacuated sheathed electric cables, air from the atmosphere has a tendency to leak in between the cable end plug and surrounding sheath. This is prevented in the present invention by a guard system which is clamped on and around the sheath covering the end plug. The guard system includes a vacuum line passing through the sheath into an annular guard-ring formed in the plug where such air collects, and a packing element and external surrounding shield through which the vacuum line is passed.

27,182

ONE-PIECE BELT-TYPE BEDDING CARRIER

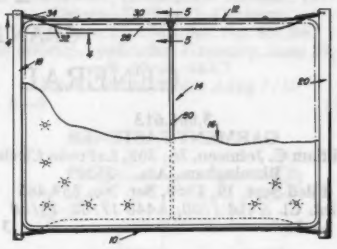
Harry Fredman, 908 SW. Washington, Peoria, Ill. 61602

Original No. 3,118,151, dated Jan. 21, 1964, Ser. No. 186,400, Apr. 10, 1962. Application for reissue June 7, 1971, Ser. No. 146,569

Int. Cl. A47c *19/02, 23/00*

U.S. Cl. 5—238 8 Claims

A slatless bed assembly comprising a pair of side rails, a pair of end boards interconnecting and extending perpendicularly to the side rails and a spring assembly supported on and between the side rails and between the end boards. Each of the side rails is of one-piece metallic cosntruction and has a right angular cross-sectional configuration substantially over a major portion of its length. The side rails associate with a tension member which pulls the rails inwardly from their respective at-rest positions so that the vertical flanges of the rails contact the spring assembly, and so that the horizontal flanges extend under the spring assembly throughout a major portion of the length of the side rails. Such a construction elim-



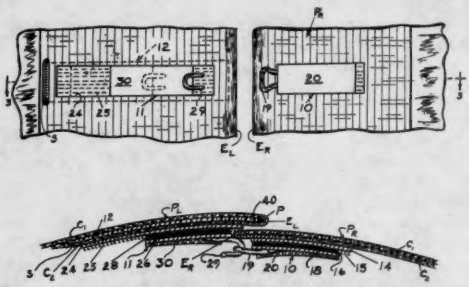
inates the necessity of slats, notwithstanding variations in the width of the end boards.

PATENTS

GRANTED MAY 11, 1971

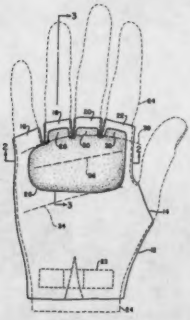
GENERAL AND MECHANICAL

3,606,613
GARMENT FASTENER
William C. Johnson, Jr., 308, LaPrado Circle, Birmingham, Ala. 35209
Filed Sept. 19, 1969, Ser. No. 859,465
Int. Cl. A41d *1/00*; A44b *17/00, 13/00*
U.S. Cl. 2—96 **3 Claims**



A device for fastening garments having overlapping panels including a first releasable fastening element having a loop thereon attached to the inside of one of the panels and a complementary second fastening element adjustably attached to the inside of the other panel and having a hook portion thereon. The hook portion on the second element is selectively engageable with the loop on the first element to fasten the panels together. The adjustability of the second element permits the amount of overlap of the panels to be selectively varied. The first and second elements are attached to the panels of the garment through a gripping material commonly known as Velcro and a stiffener is provided to maintain the shape of the overlapping panel.

3,606,614
SPORTS GLOVE
Thomas G. Dimitroff, 512 Maxine Drive, Oxford, Ohio 45056
Filed Sept. 15, 1969, Ser. No. 857,715
Int. Cl. A41c *19/00*
U.S. Cl. 2—159 **2 Claims**

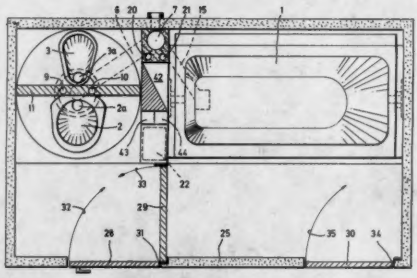


The invention relates primarily to a glove to be worn by a quarterback in football to teach proper control of the ball for passing. Essentially, the glove comprises a partial hand enclosure which leaves at least two joints of each finger and the thumb free and not covered. A pad is positioned on the palm to cover the inner joints of each finger and force the user of the glove to hold the ball on his fingertips to effect passing control thereof. The pad on the palm fills the cup-shaped opening portion of the palm adjacent the knuckles or inner joint of the fingers and prevents a player from palming the ball while handling it in one hand for passing.

3,606,615
TOOTH PROSTHESES AND SURGICAL IMPLANTS
Otto Rudiger, Essen-Heidhausen, Alfred Hoffmann, Erkrath, and Dieter Hirschfeld, Essen, Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany
No Drawing. Filed Apr. 21, 1970, Ser. No. 30,602
Claims priority, application Germany, Nov. 12, 1969, P 15 58 448.2
Int. Cl. A61f *1/00*
U.S. Cl. 3—1 **16 Claims**

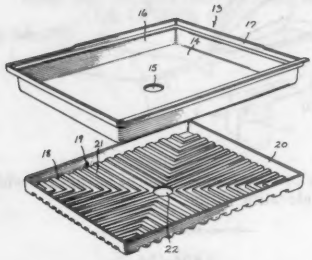
An alloy for making tooth prostheses and surgical implants. This alloy consists essentially of 5 to 15 percent chromium, 5 to 15 percent nickel, 4 to 11 percent titanium, and remainder cobalt.

3,606,616
PREFABRICATED SANITARY UNIT
Rene Bucher, Stockackerstrasse 17, Reinach, Switzerland
Filed Apr. 8, 1970, Ser. No. 26,679
Claims priority, application Switzerland, Apr. 15, 1969, 5,657/69
Int. Cl. A47k *4/00*
U.S. Cl. 4—2 **9 Claims**



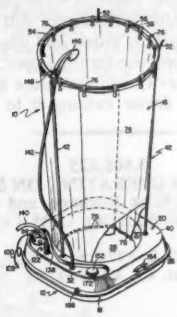
A prefabricated sanitary unit is based on a main structural member in the form of a rotatable platform. At least one vertical partition on the platform spatially separates a plurality of compartments, and a sanitary fitting is installed in each compartment. The sanitary fittings are plumbed into a common discharge pipe which is coaxial with the axis of rotation of the platform. On rotation of the platform each sanitary fitting is in turn brought to a common position permitting access to the fitting for use. Arrangements are made to supply water to the fittings as necessary. The fittings are preferably a water closet and a bidet, and a shower and wash basin may also be provided.

6,606,617
BATHING FIXTURE
Eldon R. Frazier, Sturgis, Mich., assignor to Silvercote Products, Inc., Elkhart, Ind.
Filed June 25, 1969, Ser. No. 836,327
Int. Cl. A47k 3/00
U.S. Cl. 4—145 7 Claims



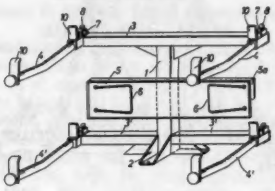
A bathing fixture, such as a shower pan or tub, comprising an upper fluid retainer member having an inclined bottom wall with a drain opening therein, and a lower support member receiving the fluid retainer member and having a bottom wall which includes rib portions conforming to the incline of the bottom wall of the fluid retainer member and engagingly supporting the same.

3,606,618
PORTABLE SHOWER BATH
Robert D. Veech, 11 Yates Ave., Commack, N.Y. 11725
Filed Mar. 31, 1970, Ser. No. 24,269
Int. Cl. A47k 3/22; F24h 1/06
U.S. Cl. 4—147 25 Claims



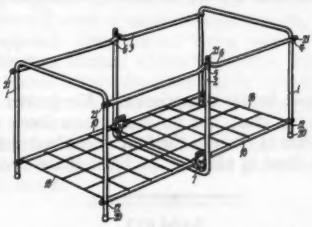
A self-contained portable shower bath in which all of the component parts are packed in a suitcase sized, hand portable, compact unit, in which there is a main body portion comprising a fluid reservoir and a basin platform, shower curtain assembly, a showerhead and plumbing therefor, all of which are demountable for stowing in the basin or between the basin and the inside of a cover designed to fit over and enclose the body portion, in which there is a motor driven pump, fluid lines and valves adapted to be selectively arranged to pump fluid from the reservoir to the showerhead, to drain the basin, to recirculate water from the basin to the showerhead, and to provide a fluid supply to the showerhead from an outside water line.

3,606,619
APPARATUS FOR ACCOMMODATING A STRETCHER
Hans Stollenwerk, Dellbrucker Haupstr. 197/201, Cologne-Dellbruck, Germany
Filed June 27, 1969, Ser. No. 837,063
Claims priority, application Germany, June 29, 1968, P 17 66 664.7
Int. Cl. A47c 17/40; A61g 7/10
U.S. Cl. 5—9 13 Claims



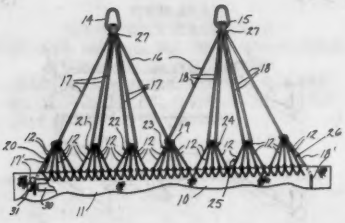
This disclosure provides an apparatus for supporting at least one stretcher in a substantially horizontal position within a vehicle enclosure. The apparatus is especially useful when mounted within an ambulance. A single columnar member is mounted in a substantially vertical position within the vehicle enclosure. A horizontal support means extends in substantially opposite directions from the columnar member. At least two cantilever arms are connected to the horizontal support means. The cantilever arms are laterally displaced with respect to each other and have free ends in a projecting position on which a stretcher is suspended above the bottom of the vehicle enclosure. Various means for folding the apparatus into a storage position are also disclosed.

3,606,620
FOLDABLE COT FOR INFANTS
James Frederick Glover, 19 Marriott St., Parkdale, Victoria 3194, Australia
Filed Sept. 8, 1969, Ser. No. 856,921
Int. Cl. A47c 2/00, 27/08
U.S. Cl. 5—99 7 Claims



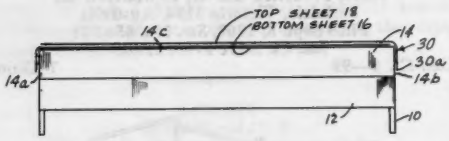
A foldable cot for infants comprising two end frames and a mid frame, upper link members pivotally connecting the end frames to the mid frame, central fittings, lower link members pivotally connecting the end frames to the central fittings and means for releasably connecting said central fittings to the mid frame, wherein said cot is foldable by first disconnecting said central fittings from the mid frame and then allowing the said end frames to move towards each other so that the said link members pivot about the points of connection of the associated end frames and towards the associated end frames.

3,606,621
HAMMOCK STRINGING METHODS AND ASSEMBLIES
Joseph V. Bertsche, Milwaukee, Wis., assignor to Algoma Net Company, Algoma, Wis.
Filed Nov. 13, 1969, Ser. No. 876,477
Int. Cl. A45f 3/22
U.S. Cl. 5—122 **8 Claims**



A hammock stringing assembly wherein the string loops formed across the end of the hammock bed are gathered together in spaced, upwardly-converging sets and the center portion of an elongated cord is arranged in the form of a loop which is inserted through the middle set of said strings, the free ends of said cord being projected through said cord looped portion and drawn taut and the elongated cord strands then being progressively strung in opposite directions back and forth between said sets of string loops and supporting rings carried on the hammock stand.

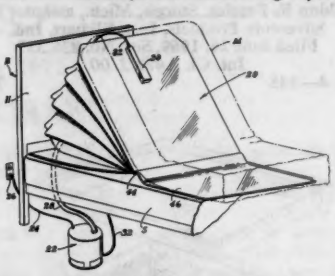
3,606,622
BED SHEET HOLDER
William K. Williams and Charles P. Williams, both of 809 Golden Ave., Golden City, Mo. 64748
Filed Sept. 29, 1969, Ser. No. 861,756
Int. Cl. A47c 21/02
U.S. Cl. 5—320 **5 Claims**



A bed sheet holder comprises two like holder sections, one for the top sheet, one for the bottom sheet, for holding both sheets in place at the foot of the bed and holding the bottom sheet in place at the head of the bed.

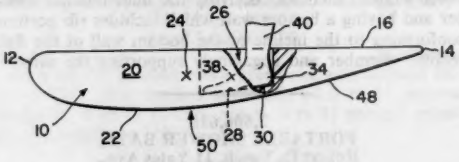
3,606,623
ADJUSTABLE BEDREST WITH IMPROVED BELLOWS STRUCTURE
Julian Robert Aymar, North Merrick, N.Y.; Michael R. Aymar, administrator of the estate of said Julian Robert Aymar, assignor to Surgical Dynamics, Inc., Berkeley Heights, N.J.
Filed Jan. 9, 1970, Ser. No. 1,727
Int. Cl. A47c 21/00
U.S. Cl. 5—327B **11 Claims**

A bellows assembly for a pneumatically operated adjustable bedrest is provided with integral channel means whereby pressurized air is introduced into what will ultimately be the wider end of the inflated bellows and is then channelled down into the opposed end or apex of the V-shaped bellows. From the apex the pressurized air is then free to move into the separate chambers defined by the channels and the adjacent confronting layers of the



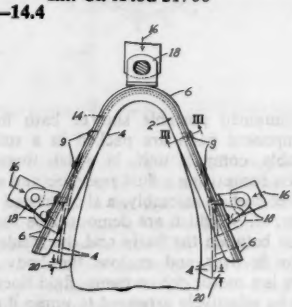
bellows. This provides a mechanical advantage which permits smooth elevating action.

3,606,624
BUOYANT PROPULSION MEANS
Clement La Rocca, 153—24 Sanford Ave., Flushing, N.Y. 11358, and Bernard Schwartz, 5 Argyle Road, Bethpage, N.Y. 11714
Filed June 25, 1969, Ser. No. 836,494
Int. Cl. A63c 15/00
U.S. Cl. 9—310D **8 Claims**



A flotation propulsion device, adapted to be used by an operator such as a human being, constructed of a buoyant material and having a foot platform positioned so that the heel of the operator will be behind the center of gravity of the device, whereby when the operator bears down on the foot platform, the device will displace greater volume in a liquid such as water, and when the weight of the operator is lessened, the forward portion of the device and the center of gravity will rise more quickly than the rear portion of the device causing it to move forward.

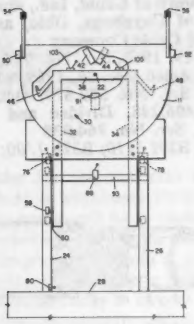
3,606,625
BAND FOR OPERATING ON SHOES
Charles J. Ioannilli, West Roxbury, and John S. Bialek, Ipswich, Mass., assignors to USM Corporation, Boston, Mass.
Filed Feb. 2, 1970, Ser. No. 7,909
Int. Cl. A43d 21/00
U.S. Cl. 12—14.4 **1 Claim**



A flexible band for wrapping about a shoe contour and having superposed portions secured together by

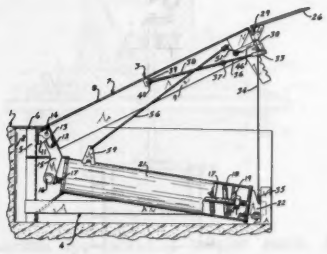
headed fasteners in a T-slot so as to move relatively as the band is wrapped around a shoe contour.

3,606,626
MOTOR CONTROL ELECTRICAL SYSTEM
Walter S. Eggert, Jr., Huntingdon Valley, Pa., assignor to Boothe Airside Services, Inc.
Filed Dec. 30, 1969, Ser. No. 889,109
Int. Cl. B65g *11/00*
U.S. Cl. 14—71 5 Claims



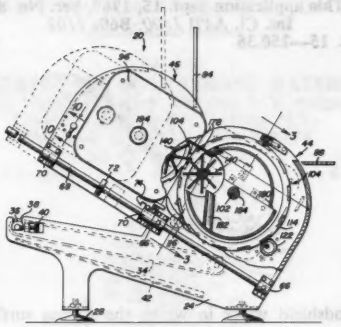
An electrical system is provided to limit the degree of expandable and rotatable movement of a passenger ramp of a vehicle adapted to provide a walkway from the vehicle to a terminal. Proper alignment of the ramp is assured during expansion and retraction operations.

3,606,627
LIP LATCHING MECHANISM FOR A DOCKBOARD
Roderick B. Potter, Milwaukee, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.
Filed Jan. 26, 1970, Ser. No. 5,864
Int. Cl. B65g *11/00*
U.S. Cl. 14—71 11 Claims



An improved lip latching mechanism for a dockboard adapted to span the gap between a loading dock and the bed of a carrier. The dockboard includes a ramp mounted on the dock and an extension lip is hinged to the forward edge of the ramp and is movable with respect to the ramp from a pendant position to an extended position. When the ramp is elevated the lip is pivoted to the extended position and simultaneously a lip latch is pivoted into engagement with one of a series of notches on a lug attached to the undersurface of the lip to hold the lip in the extended position. The lip latch is moved to the operative position by a control rod having one end connected to the supporting structure and the opposite end acts through a torsion spring against the latch. As the ramp is lowered, the spring force on the latch is withdrawn enabling the latch to pivot by gravity to its inoperative position.

3,606,628
TABLE MOUNTABLE MEAT CLEANING MACHINE
Herman F. Russell, 13900 Cherrylawn St., Detroit, Mich. 48238
Continuation-in-part of application Ser. No. 734,729, June 5, 1968, now Patent No. 3,478,380, which is a continuation-in-part of applications Ser. No. 583,206, Sept. 30, 1966, now Patent No. 3,389,414, and Ser. No. 704,971, Jan. 15, 1968, now Patent No. 3,439,369. Said application Ser. No. 704,971, being in turn a continuation-in-part of applications Ser. No. 570,616, Aug. 5, 1966, Ser. No. 583,206, Sept. 30, 1966, and Ser. No. 659,397, Aug. 9, 1967. This application Nov. 17, 1969, Ser. No. 877,229
Int. Cl. A22c *17/08*
U.S. Cl. 15—3.17 15 Claims

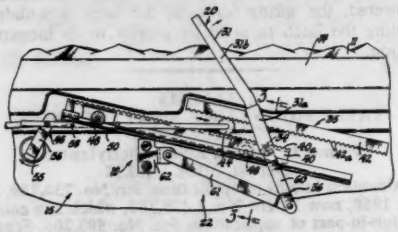


A compact table mountable meat cleaning machine incorporating a pair of elongated sections, one mounted for lateral movement away from the other at an upwardly inclination relative thereto. Each of the sections mount a rotating wire-like gripping roller, the two rollers engaging and moving cuts of meat therebetween for a cleaning of the opposed sides thereof by a pair of elongated rotating brushes located within the rollers. The movable section is biased toward the other section by gravity whereby a constant pressure is maintained on a received cut of meat. A conveyor underlies the two sections for a removal of the cleaned meat. Scrap receiving containers are positioned within each roller and generally about the associated brush.

3,606,629
SYMMETRICAL OVERLAP
Eric G. Parker, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.
Filed May 14, 1970, Ser. No. 37,213
Int. Cl. B60s *1/26*
U.S. Cl. 15—250.21 4 Claims

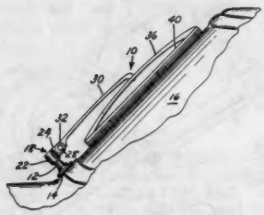
In a preferred form, this disclosure relates to a windshield wiping apparatus in which the windshield wiper is simultaneously pivoted and moved transversely of the windshield between inboard and outboard positions. The windshield wiping apparatus includes a drive mechanism having a pinion gear which is in meshed engagement with fixed and movable racks and which is reciprocated to cause the movable rack to be reciprocated and a wiper

connected to the rack to be moved transversely of the windshield. The drive mechanism further includes a linkage means operatively connected with the wiper to cause



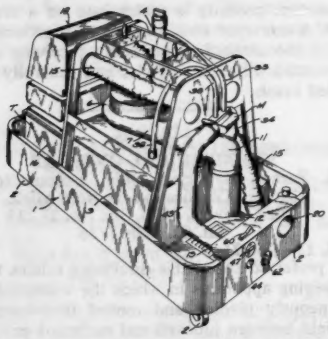
the latter to pivot between its inboard and outboard positions in response to reciprocal movement being imparted to the movable rack.

3,606,630
WINDSHIELD WIPER
Charles A. Haas, Dover-Chester Road, Ironia, N.J. 07845
Continuation of application Ser. No. 633,572, Apr. 25, 1967. This application Sept. 15, 1969, Ser. No. 858,190
Int. Cl. A47l *1/00;* **B60s** *1/02*
U.S. Cl. 15—250.36 **1 Claim**



A windshield wiper in which the wiping surface is a solid fluorocarbon polymer is disclosed.

3,606,631
PORTABLE CLEANING MACHINE
Joe F. Vassh, Racine, Wis., and Carl F. Yandt, La Crescent, Minn., assignors to Von Schrader Manufacturing Co., Racine, Wis.
Filed June 1, 1970, Ser. No. 42,266
Int. Cl. A47l *11/34*
U.S. Cl. 15—321 **20 Claims**

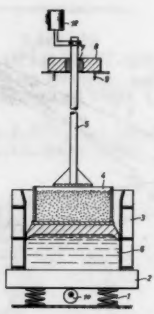


A cleaning machine for upholstery, carpeting, fabrics, or the like which generates a foam from a cleaning solution. The machine first vacuums the article to be cleaned, then applies the foam through a cleaing head which includes counter-rotating brush elements, and then the soiled foam and liquid are vacuum from the article. The counter-rotating brushes are driven by an electric motor in the head. The foam generated in the machine is passed through a hose to the head and around the motor, thereby cooling the motor and warming the foam, after which the foam goes out through the brushes.

3,606,632
EXTRUDED CABLE COVERING WITH FIBROUS INTERLAYER AND APPARATUS
Steve Bunish, County of Grant, Ind., and Rosario J. Perrone, County of Cuyahoga, Ohio, assignors to Anaconda Wire and Cable Company
Application Jan. 19, 1968, Ser. No. 714,388, now Patent No. 3,487,149, dated Dec. 30, 1969, which is a division of application Ser. No. 589,879, Oct. 27, 1966, now Patent No. 3,406,248. Divided and this application Sept. 22, 1969, Ser. No. 864,938
Int. Cl. B29f *3/10;* **B32b** *1/00; 25/02*
U.S. Cl. 18—4S **3 Claims**

In the manufacture of cables with multi-layered covering, fibrous material is introduced between the layers during the extrusion operation.

3,606,633
JARRING APPARATUS FOR PRODUCING MOLDED BODIES
Jakob Engelmann, Cologne-Mulheim, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne-Deutz, Germany
Filed Sept. 12, 1969, Ser. No. 857,459
Claims priority, application Germany, Sept. 28, 1968, P 17 83 078.3
Int. Cl. B29c *5/04*
U.S. Cl. 18—5R **2 Claims**

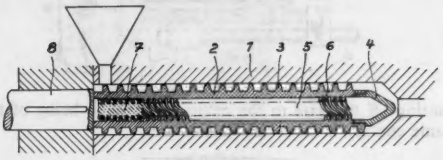


A jarring device for producing molded bodies which is provided with a jarring table on top of which is attached a mold box into which the material to be molded is introduced. A cover weight extends from above into the mold box to rest on the molding material therein. A guide rod extends vertically upwardly from the center of the cover weight and extends with its upper end slidably through a spherical guide member which is pivotally supported in a spherical bearing.

3,606,634
WORM EXTRUDERS FOR THE TREATMENT OF SYNTHETIC MATERIALS

Manfred Weinert, Metzkausen, Germany, and Klaus-Peter Fahnenstich, Springfield, Vt., assignors to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Filed Nov. 20, 1968, Ser. No. 777,236
Claims priority, application Germany, Nov. 28, 1967, P 17 29 344.6
Int. Cl. B29f 3/02
U.S. Cl. 18—12SM 7 Claims



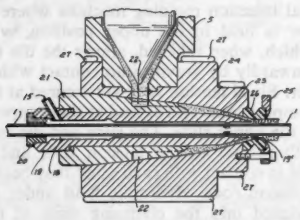
A worm extruder for the treatment of synthetic materials, wherein heat is withdrawn from the part of the worm towards the outlet end by a cooling medium provided in an axial cavity in the worm, this bore being partially filled with the cooling medium at room temperature and at a pressure below atmospheric pressure, so that the cooling liquid is subjected only to its own vapour pressure, the cavity then being hermetically sealed.

Internal screw threads may be provided in the cavity, to impel the liquid towards the tip of the worm when the worm is revolving; and a plug may be adjustably screwed into these internal screw threads to vary the area of the heat-exchange surface.

3,606,635
APPARATUS FOR JACKETING TUBULAR STOCK

Helmut Benteler, Bielefeld, and Wilhelm Lachenmayer, Berlebeck, Germany, assignors to Benteler-Werk AG, Paderborn, Germany

Filed Sept. 20, 1968, Ser. No. 761,221
Claims priority, application Germany, Sept. 29, 1967, P 16 29 716.8
Int. Cl. B29f 3/10
U.S. Cl. 18—13H 8 Claims

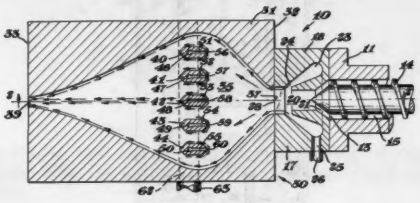


An apparatus for jacketing tubular stock. Metallic tubular stock is advanced in a predetermined direction through an extruding die in the extruding head of an extruder. In this extruding die a jacket consisting of a mixture of pre-plasticated synthetic plastic material and a blowing agent as extruded onto the outer circumferential surface of the advancing tubular stock and undergoes foaming while still within the confines of the die. As the jacketed stock issues from the die it passes through an annular member having an inner diameter slightly smaller than the outer diameter of the foamed jacket so that the peripheral surface layer of the jacket is deformed into a continuous smooth skin. Subsequently, the resulting jacketed tubular product is cooled.

3,606,636
EXTRUSION DIE

Henry L. Glass, Midland, and Walter J. Schrenk, Bay City, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Original application May 5, 1967, Ser. No. 636,481, now Patent No. 3,511,903. Divided and this application Sept. 30, 1969, Ser. No. 871,156
Int. Cl. B29d 7/02, 23/04
U.S. Cl. 18—13P 6 Claims

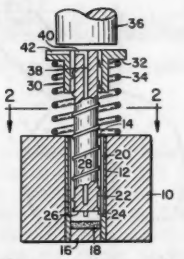


A multi-component extrusion die is shown which is particularly suited for handling corrosive polymers wherein a corrosive or degradable polymer is encapsulated by a countercurrent flow of an encapsulating polymer.

3,606,637
APPARATUS FOR COMPRESSING MATERIALS

William Nicholas Lawless, Corning, N.Y. assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 8, 1968, Ser. No. 719,536
Int. Cl. B30b 11/02
U.S. Cl. 18—16R 6 Claims



An improved hot-pressing apparatus is disclosed in which a material, such as a powder, is compressed into a highly densified body free from excessive contamination by impurities and free from porosity due to the entrapment of gases therein. Raised ribbing formed upon the body of a movable cylindrically shaped die permits ease of insertion and removal of the die in the die bore. Channels formed in the bore defining surface of the apparatus which extend from the bore entrance along a portion of the length thereof facilitate the rapid removal of gases from the material and apparatus.

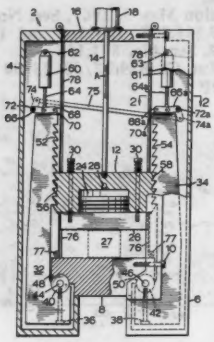
3,606,638
PRESS WITH TIE BAR MECHANISM

Ladislao (Wladyslaw) Putkowski, Toronto, Ontario, Canada (21 Limarick Ave., Weston, Ontario, Canada)

Continuation-in-part of application Ser. No. 623,929, Mar. 17, 1967. This application Nov. 3, 1969, Ser. No. 873,540
Int. Cl. B29c 3/00
U.S. Cl. 18—16R 30 Claims

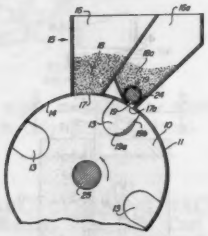
A press having a pair of platens between which an object to be pressed is located. At least one of the platens

is movable towards and away from the other to adjust the spacing between the platens. After such spacing has been adjusted, a pair of sturdy tie bars are moved to engage



both platens and lock them together. Force is then applied to the object, the resultant reaction forces being resisted by the locked together platens.

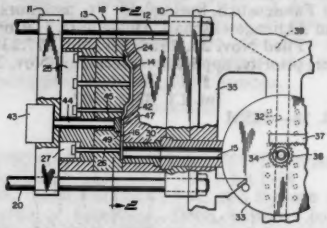
3,606,639
APPARATUS FOR MAKING ARTIFICIAL FIREPLACE LOGS HAVING COLORED FLAMES
William Hughes Brockbank, 777 East South Temple, Salt Lake City, Utah 84102
Filed June 20, 1969, Ser. No. 835,089
Int. Cl. B29c *3/04, 7/00*
U.S. Cl. 18—20C **4 Claims**



An apparatus for producing artificial fireplace logs having flame colorants as additives which provide colored flames continuously during the burning of the entire log. The apparatus has means for forming and dropping an elongate, slender mass of discrete particles of pyrogenic coloring matter into the cavity of an elongate artificial log mold; means for filling the log mold with artificial log mix, preferably containing an additional quantity of flame colorants admixed therewith; and means for compressing the log mix in the mold to form a log. The discrete particles of coloring matter found within the mold adhere superficially to the surface of the log, preferably along a localized area of the log corresponding to the top and front side of the log as it is positioned in a fireplace.

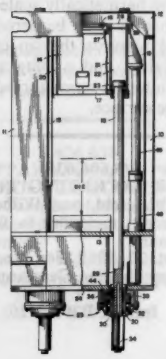
3,606,640
INJECTION MOLDING APPARATUS
William H. Schwartz, University Heights, Ohio, assignor to Lester Engineering Company, Cleveland, Ohio
Filed June 23, 1969, Ser. No. 793,406
Int. Cl. B29f *1/05*
U.S. Cl. 18—30RV **5 Claims**

An injection molding machine having relatively movable die platens adapted to support separable molds which include a gate runner leading from the shot cylinder to the die cavity, a cut-off plate actuated by a hydraulic piston-cylinder assembly to move into the gate runner



cutting off the gate to the cavity, such plate being of the same configuration as the gate runner.

3,606,641
INJECTION MOLDING MACHINE
Louis F. Carrieri, La Grange Park, and Norton D. Skinner, Palos Heights, Ill., assignors to U.S. Industries, Inc., New York, N.Y.
Filed June 6, 1969, Ser. No. 831,098
Int. Cl. B29f *1/00*
U.S. Cl. 18—30LV **6 Claims**

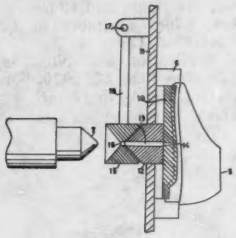


A vertical injection molding machine where the upper die member is held in the upper position by hydraulic pressure which, when relieved, allows the die member to move downwardly by gravity into contact with the lower die member. Fixed tension rods are secured at their lower ends to clamping units and extend at their upper ends into cavities in the upper slide. The slide and die move downwardly with respect to the tension rods and when the two dies are in contact with each other they become locked with the tension rods. Hydraulic fluid under pressure is then introduced into the clamping units at the bottom of the press, thereby exerting pressure downwardly on the tension rods and upwardly on the press bed, thus clamping the upper and lower die members together during the injection process.

3,606,642
INJECTION MOLDING MACHINES
Petrus Robert De Ryck, Oordegem, Belgium, assignor to Daco Machinenfabriek N.V., Oordegem, Belgium
Filed July 1, 1969, Ser. No. 838,070
Claims priority, application Belgium, July 5, 1968, 717,645
Int. Cl. B29f *1/12*
U.S. Cl. 18—30US **6 Claims**

An injection molding apparatus comprising, for each mold, a displaceable coupling member for connecting the

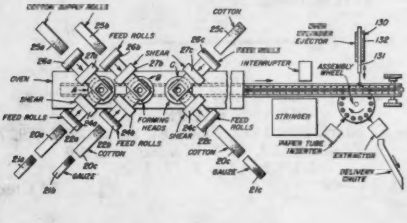
injection head to the mold. The coupling member is provided with two opposite cavities which fit respectively onto the injection head and the conical extremity of the part containing the injection channel for the mold. The cavities are interconnected by a conical channel the opening of which is narrower on the injection head side. In this manner, after the coupling member has been displaced, the molding bead presents an outer extremity of a certain length which can be easily grabbed by a plier-like extractor device.



3,606,643
MULTI-PHASE LINEAR FLOW MACHINE FOR MAKING TAMPONS

John Russell Mooney, Fort Worth, Tex., assignor to Mayfield Laboratories, Inc., Fort Worth, Tex.

Original application Jan. 6, 1966, Ser. No. 519,125, now Patent No. 3,465,390, dated Sept. 9, 1969. Divided and this application Aug. 15, 1969, Ser. No. 870,936
Int. Cl. A61l *15/00*
U.S. Cl. 19—144.5 **3 Claims**



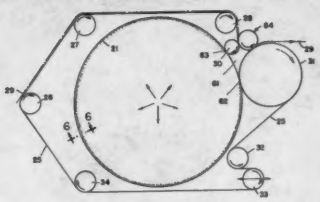
In a machine for making tampons, a plurality of tampon forming means, spaced relative to each other for synchronously forming tampons and loading same in an intermittently movable oven cylinder chain, including an assembly wheel for extracting the tampon from the cylinder chain and thereafter discharging the tampon from the machine.

3,606,644
MACHINE FOR FORMING CELLULOSIC PRODUCT

Eugene W. Wittkopf, Little Suamico, Wis., assignor to Paper Converting Machine Company, Inc., Green Bay, Wis.

Filed June 11, 1969, Ser. No. 832,299
Int. Cl. A61l *15/00*
U.S. Cl. 19—148 **7 Claims**

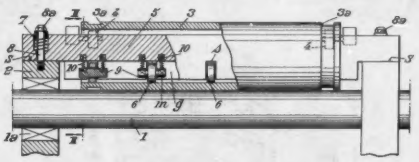
A machine for continuously forming cellulosic products such as sanitary napkins, in which fluff is deposited on a carrier web from a rotating drum, sealing means provided at the point of web transfer from the drum, means for advancing the web-supported fluff napkins toward horns employed for ensleeving the napkins with a gauze tube, and cut-off means for separating individual napkins with the leading portions of the wrapping overfolded.



3,606,645
CLEANING DEVICE FOR TEXTILE CARDING MACHINE

Louis Vignon, Geneva, Switzerland, assignor to Hispano Suiza (Suisse) S.A., Geneva, Switzerland

Filed July 8, 1969, Ser. No. 839,949
Claims priority, application Luxemburg, July 12, 1968, 56,477
Int. Cl. D01g *15/00*
U.S. Cl. 19—200 **7 Claims**



The machine is provided with a cleaning device comprising a driving cylinder and a hollow pressure cylinder disposed parallel to and tangentially along the driving cylinder. The pressure cylinder is maintained by simply resting tangentially on the driving cylinder and on retaining rollers carried by the frame, so that the pressure cylinder is in a stable situation. The hollow pressure cylinder is traversed by a non-rotatable application bar mounted on the frame with the possibility of moving away from its supporting surface against the action of return springs. The application bar coacts with the hollow pressure cylinder exclusively by the intermediary of a plurality of application rollers subjected to the action of elastic suspension means. These application rollers are placed at intervals along the application bar and bear against the internal wall of the pressure cylinder along a generatrix of contact. The overall force of the suspension means is smaller than the force of the return springs of the application bar.

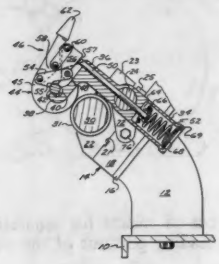
3,606,646
DRAFTING ROLL WEIGHTING MECHANISM

Philip B. Tarbox and Gordon C. Anderson, Clemson, S.C., assignors to Maremont Corporation, Chicago, Ill.

Filed Aug. 28, 1969, Ser. No. 853,773
Int. Cl. D01h *5/50*
U.S. Cl. 19—279 **4 Claims**

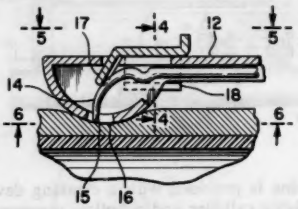
In a spinning machine, an upper drafting roll mounting and weighting mechanism is disclosed for properly receiving and urging the upper drafting roll in engagement against the lower driving drafting roll at any or all of

the front, middle and rear drafting roll assemblies. The mechanism includes an upwardly directed, open-face bearing which loosely supports the central arbor of the upper roll of any of said assemblies, and a toggle linkage which is activated to bring a bearing pressure downward-



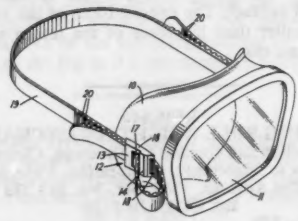
ly against the central arbor thereby urging the enlarged ends of the upper roll into engagement with the lower roll. Also disclosed is a tilting subassembly for positioning the mechanism so that the upper roll may engage the lower roll at any desired position about its circumference.

3,606,647
LOCKING PIN CLIP
Fay S. Lincoln, R.D. 1, Centre Hall, Pa. 16828
Filed Aug. 21, 1969, Ser. No. 852,051
Int. Cl. B43k *25/00*
U.S. Cl. 24—11M **4 Claims**



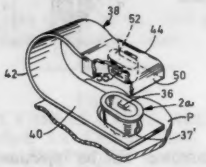
This invention provides secure fastening means for a pen or pencil in a garment pocket, to prevent loss of the article such as occurs when a conventional type clip fails.

3,606,648
FASTENING STRAP AND BUCKLE
Manfred Schuler, Newport Beach, Calif., assignor to AMF Incorporated, Jersey City, N.J.
Filed Oct. 8, 1969, Ser. No. 864,741
Int. Cl. A61f *9/02*; **B65d** *63/00*
U.S. Cl. 24—16PB **2 Claims**



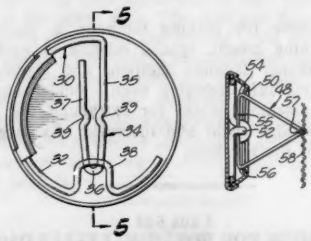
A rubberlike swim fin or face mask has integral buckles formed thereon and a rubber like ridged strap has opposite ridged ends threaded through the buckles so that the ridges make locking engagement with the buckles and with each other.

3,606,649
FASTENING DEVICE
Albert T. Buttriss, Westlake, and Clarence R. Van Niel, North Olmsted, Ohio, assignors to Eaton Yale & Towne, Inc., Cleveland, Ohio
Continuation of application Ser. No. 733,570, May 3, 1968. This application Feb. 24, 1970, Ser. No. 13,731
Int. Cl. A44b *21/00*
U.S. Cl. 24—735A **29 Claims**



A fastening device for welded securement with a support member having a body made from a metallic material, and a tip-like projection made from the material of the body and extending outwardly therefrom for securement by electrical welding to the support member. In one form, the body is of a partially closed construction, such as an inverted cup-like shape, having an exterior flange construction and/or an interior lug construction for interior or exterior mounting of other mating attachment fasteners to the support member. In other forms, the body has a generally open, such as generally U-shaped or generally inverted U-shaped, constructions having one or more of the tip-like projections for welded securement to the support member.

3,606,650
DETACHABLE BUTTON AND FASTENING MEANS THEREFOR
Wayne E. Saari, Box 1533, Santa Barbara, Calif. 92702
Filed Jan. 29, 1968, Ser. No. 701,190
Int. Cl. A44b *1/18, 1/26*
U.S. Cl. 24—90 **14 Claims**

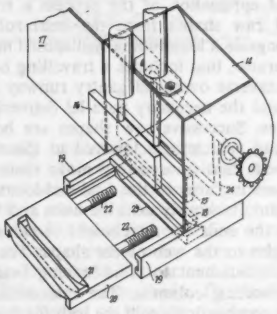


A garment fastening system comprising a button having a diametrically extending attaching means adapted to engage an appropriate loop, or similar fastening means, attached to a garment, with the attaching means having means for centering the button on the loop, whereby said buttons can be detached and interchanged as desired.

3,606,651
CLAMPING DEVICES
Robert H. Goodman, 4654 Parkside Drive, Wauwatosa, Wis. 53226
Filed May 8, 1969, Ser. No. 823,083
Int. Cl. A44b *21/00*
U.S. Cl. 24—255BS 3 Claims

A hoop-like clamping device especially useful for clamping together articles of clothing during the laundering thereof.

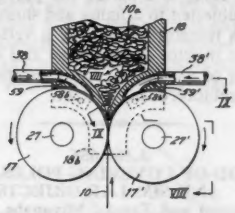
3,606,652
APPARATUS FOR APPLYING BRIDGING MEANS TO A CONTOURED ROOFING TILE
Leslie Gerald Hammond, Bletchley, England, assignor to Anchor Building Products Limited, Leighton Buzzard, Bedfordshire, England
Filed Oct. 16, 1968, Ser. No. 768,146
Claims priority, application Great Britain, Feb. 9, 1968, 22,692/68
Int. Cl. B28b *13/06*
U.S. Cl. 25—103 6 Claims



Apparatus for applying a bridge across the trough of a contoured roofing tile in order to inhibit or prevent rain water penetrating between overlapping tiles when in position on a roof; comprising, a member defining a chamber which is charged from a hopper with a sand and cement mixture by operation of a first plunger, the member then being moved to a position above the tile, whereupon the charge is pressed into the tile by operation of a second plunger.

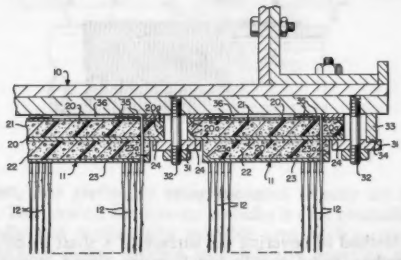
3,606,653
STUFFER CRIMPER FOR TEXTILE MATERIAL
Robert K. Stanley, Media, Pa., assignor to Techniservice Corporation, Kennett Square, Pa.
Continuation-in-part of application Ser. No. 675,919, Oct. 17, 1967, now Patent No. 3,491,420, dated Jan. 27, 1970. This application May 21, 1969, Ser. No. 826,411
Int. Cl. D02g *1/12*
U.S. Cl. 28—1.6 18 Claims

This invention relates to apparatus for stuffer crimping of textile material, usually in the form of a relatively coherent strand or the like. It provides for fluid cooling of the contacting surfaces of at least the feed rolls of stuffer crimpers, thereby enabling preheated material to be stuffer



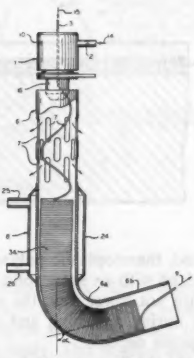
crimped without localized frictional heating from the stuffing thereof.

3,606,654
NEEDLE SUPPORT FOR FELTING MACHINE
Richard S. F. Dilo, Eberbach-Neckar, Germany
Filed Dec. 22, 1969, Ser. No. 886,890
Int. Cl. D04h *18/00*
U.S. Cl. 28—4R 8 Claims



A needle bar for use in felting machines or the like comprising alternate laminations of metal strips and plastic layers. The needles extend through aligned holes in the metal strips and through the plastic layers. The plastic is held under compression for expanding the plastic and thus securing the needles in place.

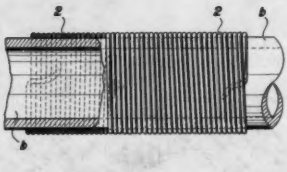
3,606,655
PROCESS AND APPARATUS FOR THE CONTINUOUS TENSION-FREE FIXING AND SHRINKING OF CABLES OF UNCRIMPED FILAMENTS
Siegfried Oberlander, Kolpingstr. 4, Erlenbach am Main, Germany, and Karl Ostertag, Rosenstr. 18, Elsenfeld am Main, Germany
Filed Sept. 22, 1969, Ser. No. 859,957
Claims priority, application Germany, Oct. 9, 1968, P 18 01 976.6
Int. Cl. D02g *1/16;* D06c *1/00*
U.S. Cl. 28—59 5 Claims



Process for the continuous, tension-free fixing and shrinking of cable of uncrimped filaments, yarns or the

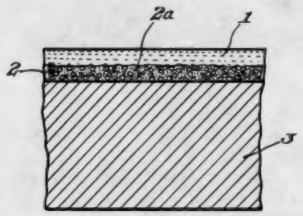
like wherein the cable is conducted by means of a compressible medium in coiled or spiral form through a tubular treatment zone, and during the passage through the said zone is subjected to a fixing and shrinking treatment; and apparatus therefor embodying a vertical tube and a rotating, cable injector on the upper end of the tube, the outlet opening of which tube lies eccentrically in respect to the axis of rotation of the injector.

3,606,656
METHOD OF COVERING POLES, SHAFTS AND SIMILAR OBJECTS
Takashi Kumagai and Tasuku Miyanabe, Tokyo, Japan, assignors to Olympic Fishing Tackle Co., Ltd., Saitama-ken, Japan
Filed June 29, 1970, Ser. No. 50,371
Int. Cl. D06 *1/00*
U.S. Cl. 28—76T 7 Claims



Method of covering the surface of a shaft or other bar member, using a cylindrical woven sleeve, wherein the woof is made of a heat shrinking fiber and the warp of a soluble fiber. The cylindrical woven sleeve is disposed to loosely cover the desired portion of the shaft and is then heated and washed by the solvent. The warp dissolves and is removed while the woof shrinks so as to tightly wrap around the surface of the shaft.

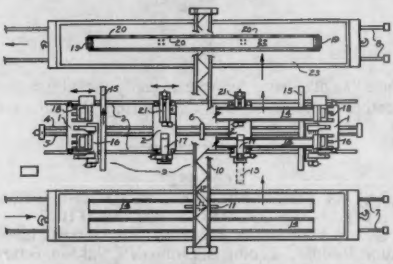
3,606,657
METHOD OF MAKING BEARINGS AND OTHER ANTIFRICTION MEMBERS FROM A SYNTHETIC RESIN MATERIAL CONTAINING LUBRICANT
Masayuki Horikawa, Tokyo, Japan, assignor to Oiles Kogyo Kabushiki Kaisha, Tokyo, Japan
Continuation-in-part of abandoned application Ser. No. 606,389, Dec. 30, 1966. This application Aug. 20, 1969, Ser. No. 851,717
Int. Cl. B23p *11/00*
U.S. Cl. 29—149.5NM 6 Claims



In this method, thermoplastic polyacetal synthetic resin powders are mixed with an excess of a lubricant oil heated to a temperature not lower than the melting point of the synthetic resin during agitating, and allowed to settle to obtain a precipitate deposit.

The resulting precipitate was pulverized to produce lubricant containing thermoplastic synthetic resin powders, and the powders obtained are impregnated and coated on a porous powder metallurgical layer of bronze alloy sintered on the surface of a steel plate, which plate has a layer of lubricant free synthetic resin thereon, thereby manufacturing composite bearings.

3,606,658
STRUCTURAL MEMBER FABRICATING PROCESS
John R. McConnell, 148 Woodside Ave., Ridgewood, N.J. 07450
Continuation-in-part of application Ser. No. 737,654, June 17, 1968. This application May 19, 1970, Ser. No. 38,668
Int. Cl. B23p *17/00, 19/00*
U.S. Cl. 29—155R 9 Claims

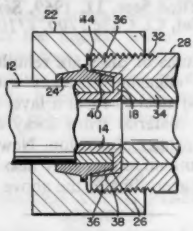


A method is disclosed of handling and completely fabricating structural steel floor members from raw steel shapes into precisely fitting interlocking unit elements that form with the necessary columns a multiple-cell cage for the support of floors, roofs, walls and other elements. In a typical application of the process a trailer-load or car-load of raw shapes from the steel rolling mills is shunted alongside a longitudinally-disposed multiple fabricating apparatus, that includes a travelling hoist operable along a transverse overhead gantry runway spanning the apparatus and the necessary parallel delivering and shipping vehicles. Successive raw shapes are hoisted out of the delivering vehicle and lowered to the adjacent dual conveyor belts that transversely move them individually into the operating area of the dual end-located three way drills that simultaneously drill the webs and flanges of the shape near the ends for attachment of pairs of end connection angles to the web of the shape. The flange holes permit the attachment to wind-bracing brackets located on the supporting columns. The intermediately located vertically pivotable drills drill the web for floor beam connections. Moved on to the forward half of the apparatus multiple rivets attached to a lower connection angle are heated, the angle is assembled to the beam web, an upper mating connection angle is placed over the projecting rivets and plural air hammers head the rivets over the three assembled pieces of steel. This operation is performed at each end of the shape. The now completed member is lifted off the dual belts and stacked in an empty parallel vehicle for outbound shipping. This overall process is applicable to other combinations of different fabricating operations, in part and in simplified abbreviated versions.

3,606,659
METHOD OF COUPLING AND/OR JOINING LINED PIPE
James F. Robbins, Westford, Mass., assignor to Sybron Corporation, Rochester, N.Y.
Filed Nov. 18, 1969, Ser. No. 877,746
Int. Cl. B21d *53/00;* B21k *29/00;* B23p *15/26*
U.S. Cl. 29—157 4 Claims

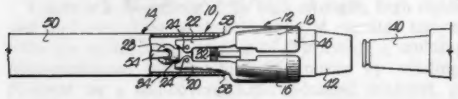
Disclosed is a coupling and a method for joining tin lined tubings wherein a portion of the tubing is removed to expose a portion of the tin lining. The exposed lining

is then flared over the end of the tubing so that during connection of the tubing to a fitting by conventional ferrule and nut means, the flared tin is forced against and



over the ferrule to form a joint completely lined with tin including a layer of tin between the opposed pipe and fitting faces.

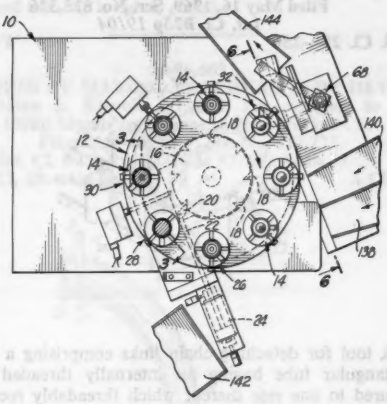
3,606,660
REMOTE OPERATING TOOL FOR ELECTRICAL APPARATUS
John P. Davis, Hallsville, Mo., assignor to A. B. Chance Company, Centralia, Mo.
Filed Nov. 25, 1969, Ser. No. 879,796
Int. Cl. B25b *27/02;* **H01r** *43/00*
U.S. Cl. 29—203 **7 Claims**



An electrically insulated gripping tool has a pair of opposed, concavo-convex jaws joined to respective, hingedly interconnected, spring-loaded arms. The arms are coupled to a manually reciprocable plunger carried within an open-ended tube, and extension or retraction of the plunger causes opposed outer cam surfaces on the arms to engage the tube at its open end and effect opening or closing of the jaws respectively. The leading ends of the jaws are configured to provide clearance for the terminal leg of a connecting elbow held by the tool, and opposed open areas on the jaws define respective sections of an aperture for clearing the transverse cable leg of the elbow.

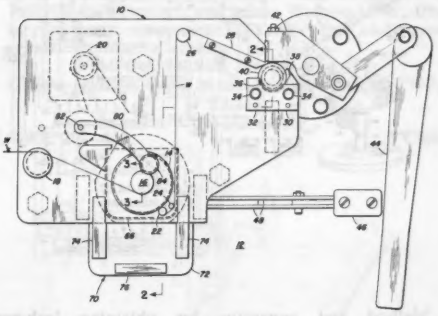
3,606,661
PRODUCTION ASSEMBLY MECHANISM FOR TELESCOPICALLY ASSEMBLED AND INTERFERENCE FORMED PARTS INCLUDING TRANSFER ARM MECHANISM
Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631, and Fredric E. Schmuck, 535 Century Drive, Anaheim, Calif. 92805
Filed Aug. 22, 1969, Ser. No. 852,316
Int. Cl. B23p *19/04*
U.S. Cl. 29—208D **16 Claims**

A series of spaced fixtures are mounted on a rotatable indexing table progressively movable between first and second and third assembly stations and a fourth pick-off station so that production parts, such as three parts of a ball cock lower assembly, may be recevied at the first assembly station in an initially telescoped condition, formed into an intermediate telescoped condition at the second assembly station by an intermediate assembly ram, formed into a final telescoped and interengaged condition at the third assembly station by a final assembly ram and automatically removed from the indexing table at the fourth pick-off station by a pick-off mechanism. The fixtures include resiliently urged pivotal holding fingers maintaining proper part alignment and permitting the various telescoping and reforming operations, while the intermediate and final assembly rams operate



together, one preferably being mounted directly on the other. The pick-off mechanism includes a cam controlled, vertically and horizontally movable arm having releasable pick-up means thereon automatically engaging and retaining finally assembled parts at the fourth pick-off station and removing the parts both vetrically and horizontally to a location remote from the indexing table.

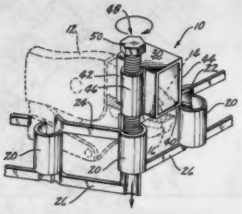
3,606,662
FILM WINDING AND STAKING APPARATUS
James E. Hoover, Binghamton, N.Y., assignor to GAF Corporation, New York, N.Y.
Original application June 30, 1967, Ser. No. 679,052, now Patent No. 3,518,746, dated July 7, 1970. Divided and this application Sept. 2, 1969, Ser. No. 870,862
Int. Cl. B23p *19/04;* **B65b** *53/04, 63/04*
U.S. Cl. 29—240 **8 Claims**



This invention relates to a film winding and staking apparatus and method. A continuous segment of film is wound or spooled upon a spindle which is then replaced by a film cartridge body. The trailing end of the film is staked to a scroll disc or take-up core and then superimposed on the cartridge body. Subsequently, the assem-

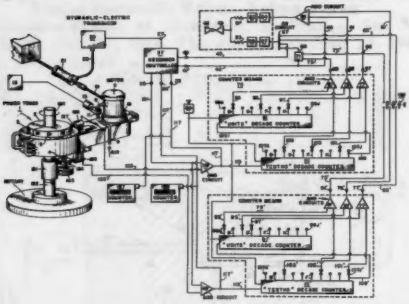
bled film and components are conveyed or slid to a pivotable guide plate, which is rotated to an angular inclination to facilitate the enclosure of the film and cartridge components by a film cartridge cover.

3,606,663
TOOL FOR DETACHING CHAIN LINKS
Joseph Leo Ahart, Sr., R.R. 1, Dow City, Iowa 50017
Filed May 16, 1969, Ser. No. 825,326
Int. Cl. B23p *19/04*
U.S. Cl. 29—256 **4 Claims**



A tool for detaching chain links comprising a hollow rectangular tube having an internally threaded sleeve secured to one side thereof which threadably receives a bolt member therein. The bottom side of the tube has a guide means thereon to enable the tube to be properly aligned on the outside of the chain link. A clamp-type adjustable wrench is used to maintain the tool on the chain link. The chain links are detached by threadably turning the bolt member in the sleeve which causes the lower end of the bolt member to extend into the slotted sleeve of one chain link and to force the pintle pin of the attached chain link therefrom.

3,606,664
LEAK-PROOF THREADED CONNECTIONS
Peter D. Weiner, Bryan, Tex., assignor to Esso Production Research Company
Filed Apr. 4, 1969, Ser. No. 813,573
Int. Cl. B23p *17/00*
U.S. Cl. 29—400 **17 Claims**

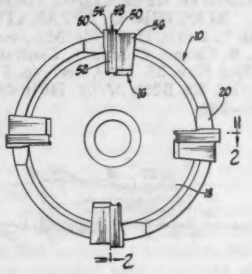


Method and apparatus for obtaining leak-proof threaded pipe connections for either double-end makeup or single-end makeup. In each instance, one pipe section is rotated and the torque required for such rotation is measured and the number of turns of the rotated pipe section are counted. The number of turns of the coupling are also counted in double-end makeup. Signals indicative of such torques and turns are fed to apparatus for control of connection makeup.

3,606,665
METHOD OF RESTORING WORN BRAKE SURFACES
Harold Glucoft, 1351 Sunset Ave., Santa Monica, Calif. 90405
No Drawing. Filed Sept. 11, 1969, Ser. No. 857,212
Int. Cl. C23c *1/00, 1/10*
U.S. Cl. 29—401 **10 Claims**

Worn brake drums or discs are rebuilt by spraying the worn brake-shoe engaging surfaces with a mixture of molten copper and steel to form a layer of a thickness at least that of the material worn away or if more, it is machined to the proper dimension. New brake drums as furnished by the manufacturer may also be provided with a braking surface according to the above method.

3,606,666
METHOD OF ASSEMBLING CUTTING TOOL
Charles T. Briggs, Jr., Royal Oak, Mich., assignor to Kysor Industrial Corporation, Farmington, Mich.
Filed Dec. 22, 1969, Ser. No. 886,851
Int. Cl. B23q *17/00;* **B23p** *9/00*
U.S. Cl. 29—407 **11 Claims**



A method of assembling a plurality of substantially identical cutter blades within a predetermined runout tolerance, in this case .0004 inch, in respective ones of a plurality of spaced blade-receiving stations in the body of a rotatable cutting tool having a back face defining a reference plane. More specifically, the method comprises mounting a master cutter blade in a first one of the stations of the cutter body and gauging a reading in inches to four decimal places of the face runout of the master cutter blade relative to the aforementioned reference plane. Thereafter, the master cutter blade is successively mounted in all other stations of the cutter body and, while disposed in such other stations, the respective positions of the master cutter blade are gauged and readings taken in inches to four decimal places of the face runout of the master cutter blade relative to the face runout thereof when disposed in the aforementioned first station of the cutter body. In the event that the position of the master cutter blade in any of the aforementioned other stations is lower than its position in the aforementioned first station of the cutter body, thereby giving one or more negative readings, any such negative reading is eliminated by adding to each reading an amount equal to the difference between .0000 inch and the greatest negative reading. Two shims are provided having thicknesses which differ by substantially .0005 inch. Preferably, these shims have thicknesses of .001 and .0015, respectively. If the reading at the highest station ends in any digit from 0 to 4, one of the thinner shims (.001) is added to such station, and if the reading at the highest station ends in any digit from 5 to 9, one of the thicker shims (.0015) is added to such station. Thereafter, the two shims may be added in whatever quantities and thicknesses are required to all other

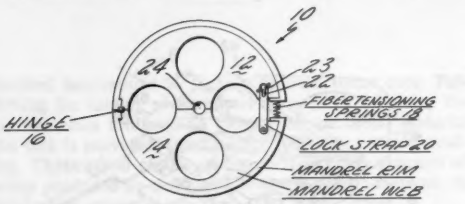
stations to bring them to a face runout within .0004 inch of the shimmed highest station; that is, to provide the predetermined runout tolerance. In this step method, it is preferable for the purpose of simplicity that at least one of the thniner shims is added to all stations, other than the highest station, ending in any digit from 0 to 4 and that one of the thicker shims (.0015) is added to all stations, other than the highest station, having a reading ending in any digital from 5 to 9. After shims are mounted in all of the stations, a plurality of cutter blades, each being substantially identical to the master cutter blade and hence to each other, are mounted in each station.

3,606,667

METHOD OF FABRICATING FIBER-REINFORCED ARTICLES

Kenneth G. Kreider, Glastonbury, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 27, 1968, Ser. No. 763,278
Int. Cl. B23p 17/00
U.S. Cl. 29—423 **17 Claims**



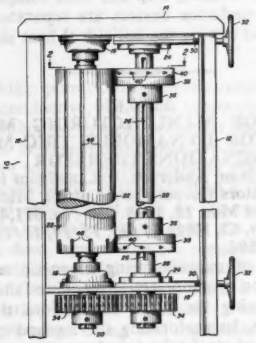
Filaments characterized by high strength, high rigidity, and high resistance to deterioration at elevated temperatures are utilized in a process of fabricating a multilayer fiber-reinforced metal matrix composite by winding a filament on a foil-covered, spring-loaded mandrel, preheating the mandrel, plasma arc spraying metal matrix material in coalescent form onto the filament windings so as to form a monolayer tape, and diffusion bonding a plurality of such tapes together in layers, the process being characterized by a high degree of reproducibility.

3,606,668

APPARATUS FOR EMBOSSING STEEL STRIP AND METHOD OF TREATING SAME

Harold K. Young, Herbert Wald, and William O. Blanch, Baltimore, Md., assignors to Bethlehem Steel Corporation

Filed Mar. 20, 1969, Ser. No. 808,927
Int. Cl. B23p 17/00
U.S. Cl. 29—423 **2 Claims**



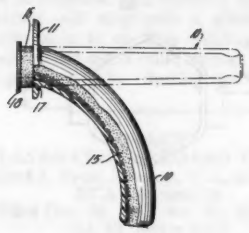
Steel strip is passed through an embossing apparatus which produces a series of spaced projections along each edge of the strip. The male embossing members each comprise a wheel having a plurality of protuberances disposed along the periphery thereof, the spacing between each pair of adjacent protuberances differing about the periphery. The strip is then coiled about a vertical axis whereby substantially all of said projections abut undeformed portions of strip convolutions adjacent thereto. Heated gas is subsequently passed between the convolutions of the coil to change the characteristics of the metal strip, after which the projections are removed from the edges of the strip and the strip is tightly coiled.

3,606,669

METHOD OF MAKING TRACHEAL TUBE DEVICE

Mern S. Kemble, Clarion, Pa., assignor to Philip Morris Incorporated, New York, N.Y.

Filed May 26, 1969, Ser. No. 827,771
Int. Cl. B23p 19/00; B29c 17/02; A61b 17/24
U.S. Cl. 29—434 **4 Claims**



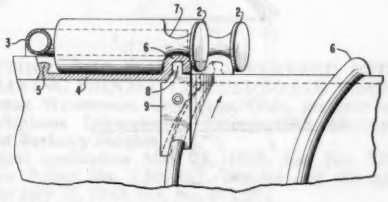
A tracheal tube device having an outer tube and an inner tube insertable in and removable with respect to the outer tube is made by a method in which the outer tube is cast in initially straight form from a thermoplastic material and before cooling is bent into the desired radius and upon cooling the tube is relatively rigid and stiff in the pre-set curved form; the inner tube likewise being cast in a straight form but of an elastomeric material which remains flexible when cooled. In use the inner tube is inserted in the outer tube and readily conforms to the radius and shape thereof. The inner tube is disposable and is easily removed and replaced by a new sterile tube.

3,606,670

METHOD FOR FORMING SPIRAL WOUND SYNTHETIC PIPES

Michael Wienand, Siegburg, Klaus Jensen, Buisdorf, Franz Primessing, Mondorf, and Franz Werner Alfter, Oberlar, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

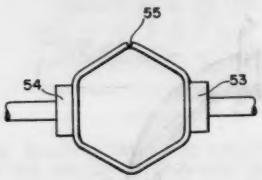
Filed Oct. 2, 1968, Ser. No. 764,427
Claims priority, application Germany, Oct. 2, 1967, D 54,252
Int. Cl. B23p 11/02
U.S. Cl. 29—450 **7 Claims**



A pipe is continuously formed by spirally winding a band onto the cylindrical portion of a mandrel after the band exits from a synthetic material extruding

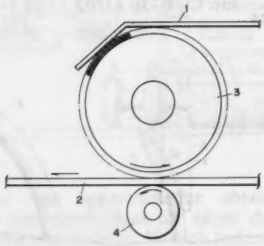
machine while still thermoelastic or after a preformed band is passed through the suitable heating device. One longitudinal edge of the band is provided with a radially outwardly widening tongue and the other longitudinal edge of the band is provided with a radially inwardly widening channel. In forming the pipe, the tongue is cooled to be rigid and inserted into the thermoelastically heated channel of an adjacent lap of the spirally wound band.

3,606,671
METHOD AND APPARATUS FOR FORMING POLE-LIKE STRUCTURES
Eugene W. Pearson, Orinda, Calif., assignor to Pacific Press & Shear Corp.
Filed July 10, 1968, Ser. No. 743,693
Int. Cl. B23k *31/02*
U.S. Cl. 29—477.7 **5 Claims**



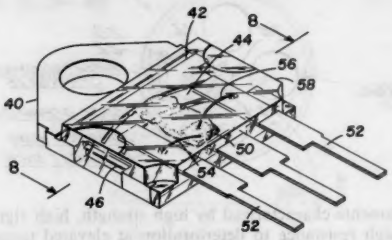
A pole-like structure of polygonal section formed from a blank by first similarly bending and bevelling a pair of opposite marginal portions, forming a series of longitudinal bends in said blank intermediate said marginal portions, to bring said marginal portions toward each other to form a structure having an open seam at one corner, clamping the open seam structure under sufficient pressure to bring the marginal portions into substantial contact with each other to form a trough, welding the seam along the trough and shaping the welded corner to conform to the others.

3,606,672
METHOD OF MANUFACTURING A CLAD PLATE OF ALUMINUM AND OTHER METALS
Shiro Terai and Michiki Hagiwara, Nagoya-shi, Japan, assignors to Sumitomo Light Metal Industries Limited, Tokyo, Japan
Filed May 7, 1968, Ser. No. 727,153
Claims priority, application Japan, May 15, 1967, 42/30,748
Int. Cl. B23k *1/20, 31/02*
U.S. Cl. 29—488 **3 Claims**



This disclosure relates to a method of manufacturing a composite metal plate of aluminum and clad with a dissimilar metal in which an enhanced affinity between the two metals thus combined is obtained, and wherein one of the two component metal plates which is harder than the other is roughened on its surface, and particles of the other metal which is softer than the harder metal are blown against the roughened surface of the harder metal plate, and thereafter the softer metal plate which is of the same material as the blown metal particles is laid on and laminated with the surface of the former metal plate and the thus combined metals are then subjected to hot rolling at a temperature of 400° to 450° C.

3,606,673
PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES
James H. Overman, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Aug. 15, 1968, Ser. No. 752,822
Int. Cl. B01j *17/00;* **H01l** *1/10*
U.S. Cl. 29—588 **8 Claims**

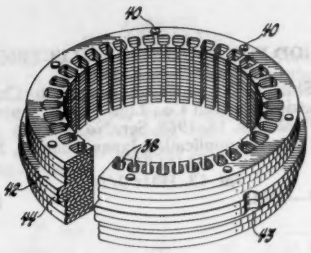


A plurality of semiconductor devices are encapsulated simultaneously in a thermosetting plastic by a process that includes the use of transfer molding techniques. Discrete semiconductor devices, such as transistors, are strip molded as a unit and separated after the thermosetting plastic has cured. Prior to the molding process, an array of lead wires interconnected by partially sheared tie-bars are staked to individual heat sinks also formed in a strip. A semiconductor device is mounted to each of the individual heat sinks and whisker lead wires are bonded to the active regions of the device and the lead wires. To prevent contamination of the semiconductor junctions with atmospheric impurities, the wafers are coated with a protective material. Grooves are coined into the heat sink to limit the wafer coating material to a restricted area. After the strip molding step has been completed, the individual semiconductor devices are separated by cutting the tie-bars and sawing the individual heat sinks.

3,606,674
METHOD OF MANUFACTURING MAGNETIC CORES FOR DYNAMOELECTRIC MACHINES AND LAMINATIONS THEREFOR
David E. Givan, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed Mar. 28, 1969, Ser. No. 811,412
Int. Cl. H02k *15/00, 15/14, 15/16*
U.S. Cl. 29—596 **9 Claims**

A method of manufacturing magnetic cores such as stator cores for dynamoelectric machines and the method of manufacturing the stator laminations that form the magnetic core. In performing the method of this invention a length of steel tubing is formed to provide a part that has a concave inner wall and a convex outer wall. This part is then folded such that half sections of the concave inner wall are forced together to form an annular

disk. In practicing the method of this invention it is possible to simultaneously fold and coin the metal part to thereby provide a lamination which is useful in forming a finished magnetic core. As an alternative to this method this invention contemplates folding the metal material without coining, stacking the annular disks formed by the folding operation and then coining the



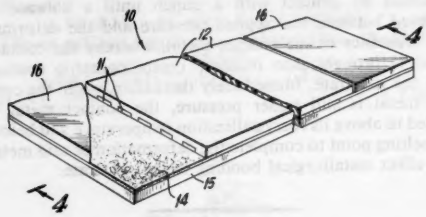
stacked laminations to form a finished stator core. Following the folding of the metal material or following the simultaneous folding and coining of the metal material the disk is provided with slots for receiving a stator winding. The method of this invention reduces the amount of scrap produced as compared to conventional methods of fabricating stator laminations and stator cores.

3,606,675

METHOD OF MAKING A KEEPERED WORD-LINE STRUCTURE FOR A THIN MEMORY PACKAGE

David J. Crimmins, Stockton, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Nov. 17, 1969, Ser. No. 877,334
Int. Cl. H01f 7/06
U.S. Cl. 29—604 3 Claims



Strips of high permeability metal material which is magnetically conductive, but which is non-electrically conductive, are embodied in a one-sided flat conductor cable. Next, location or registration holes are formed precisely located relative to the high permeability metal strips, and then the one-sided cable is laminated to a thin layer of a partially cured epoxy sheet such as pre-preg (of greater length than the one-sided cable), with the magnetic conductors faced down against the pre-preg. A strip of electrically conductive material is laminated to the pre-preg at each end of the one-sided cable, while a sheet of electrically conductive material is laminated to the opposite side of the pre-preg. Using the registration holes as a guide, the electrically conductive strips and the electrically conductive sheet is etched to produce the word-lines and turn-arounds, thereby completing the keepered word-line structure.

3,606,676

SILICATE BONDING OF MAGNETIC CORES

Dale M. Kohler, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Mar. 21, 1969, Ser. No. 809,268
Int. Cl. H01f 7/06
U.S. Cl. 29—605 6 Claims

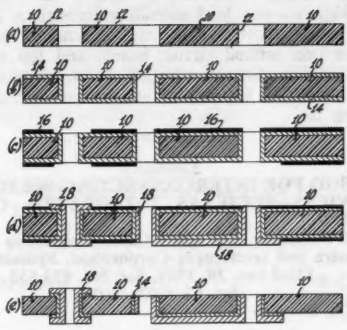
A method of bonding the contiguous windings of a wound core of magnetic strip material by the steps which include coating said strip with a silicate solution and drying in situ prior to or after winding into said core. During a subsequent stress relief anneal, the silicate fuses the core together thereby effecting the bond.

3,606,677

MULTILAYER CIRCUIT BOARD TECHNIQUES

Robert J. Ryan, Trenton, N.J., assignor to RCA Corporation

Filed Dec. 26, 1967, Ser. No. 693,672
Int. Cl. B41m 3/08
U.S. Cl. 29—625 7 Claims



The disclosed technique comprises the lamination of two or more circuit boards using a controlled flow adhesive layer; the controlled flow adhesive permitting through holes to remain unobstructed after lamination. Final interconnection is made by plating through the holes, thereby providing the requisite interconnections between surfaces.

3,606,678

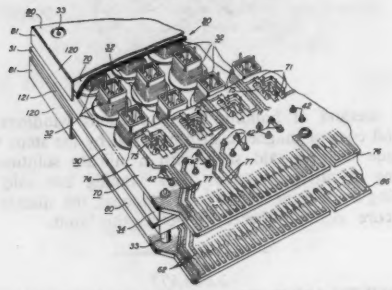
METHOD FOR MAKING A FERREED SWITCH HAVING PRINTED CIRCUIT BOARD WIRING

Norman Wasserman, Columbus, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.

Original application May 28, 1968, Ser. No. 732,608, now Patent No. 3,500,267. Divided and this application July 31, 1969, Ser. No. 871,076
Int. Cl. H05k 3/30
U.S. Cl. 29—626 4 Claims

A ferreed switch is disclosed in which a shunt plate assembly wired in a standard pattern, partially assembled by simultaneously positioning all of the reed

switches with a magnetic jig, and located between two printed circuit boards is housed in a protective cover and equipped with lever arms adapted to facilitate installation in an operating environment. The shunt plate assembly and printed circuit boards are assembled so that at each crosspoint a coil support in the shunt plate assembly is in register with a set of small holes in one printed circuit board and a large hole in the other. Moreover, each coil support is sealed at one end, internally divided into compartments by a separator, and perforated by a lead



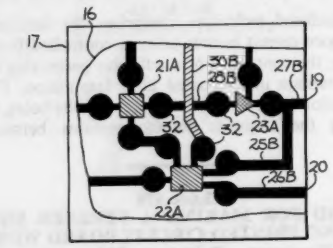
hole in each compartment. Finally, each reed switch in the coil supports is located in a separate compartment, has been positioned so that its airgap is in register with a magnetically, conducting portion of the shunt plate assembly, has one lead extending through a lead hole in the coil support to a point of attachment in a small hole in one printed circuit board, and has the other lead extending through a large hole in the other printed circuit board to a point of attachment with a flexible locating tab.

3,606,679

METHOD FOR INTERCONNECTING SOLID STATE DEVICES SUCH AS INTEGRATED CIRCUIT CHIPS

Jon M. Schroeder, Los Altos, Calif., assignor to Fairchild Camera and Instrument Corporation, Syosset, N.Y.

Filed Oct. 29, 1969, Ser. No. 874,532
Int. Cl. G03c *5/04*
U.S. Cl. 29—626 **1 Claim**



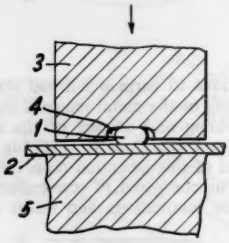
A method for interconnecting device chips such as integrated circuit chips on a substrate is disclosed. A photographic mask is made from a transparent sheet which is placed on a diagram of a circuit containing the chips. Templates representative of the device chips and strips representative of the interconnecting leads are imposed on the transparent sheet. Separate masks for the crossover leads and for forming holes in a dielectric to allow the connections between the crossover leads and the remainder of the circuit are formed from second and third transparent sheets. The masks made from these transparent sheets are utilized to form the interconnections in the circuit by photofabrication techniques.

3,606,680

METHOD FOR PRODUCING ELECTRICAL CONTACT ELEMENTS

Akira Shibata, Tokyo, Japan, assignor to Chugai Electric Industrial Co., Ltd., Tokyo, Japan

Filed Nov. 18, 1968, Ser. No. 776,336
Claims priority, application Japan, June 21, 1968, 43/42,967
Int. Cl. H01r *9/16*
U.S. Cl. 29—630C **8 Claims**



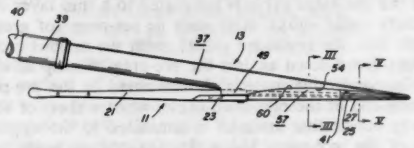
A contact metal having good cold-pressure bonding properties is bonded to a metal substrate which normally has a low propensity for cold-pressure bonding. The contact metal, e.g. silver, is placed on the metal substrate, such as stainless steel, and the contact metal immediately cold deformed by contact with a punch until a balance is achieved between the applied pressure and the deformation resistance of the contact metal, whereby the contact metal is brought into intimate crystallographic contact with the substrate. Immediately thereafter, while the contact metal is still under pressure, the contact metal is heated to above its recrystallization temperature and below its melting point to complete the deformation of said metal and effect metallurgical bonding to the substrate.

3,606,681

VACUUM ATTACHMENT FOR SCISSORS

Elmer T. Rogers, Rte. 1, Wildersville, Tenn. 38388, and Charles E. Johnson, Rte. 2, Lexington, Tenn. 38351

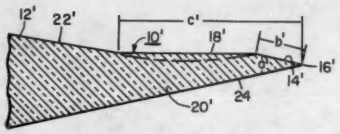
Filed Feb. 5, 1970, Ser. No. 8,886
Int. Cl. B26b *13/22*
U.S. Cl. 30—133 **4 Claims**



A device for adapting a pair of typical barber scissors to a typical vacuum fan having a suitable reservoir for

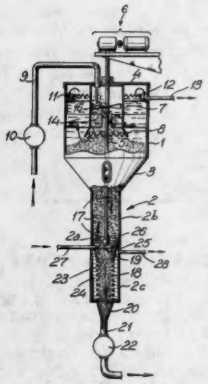
collecting the accumulation of clippings of hair. The device includes an elongated tubular member having at the one end a mouthlike portion adjacent and secured to the one blade of the scissors with the other end terminating at a swivel connector and a flange member attached to the other blade which increases and decreases the size of the mouth as the scissors are opened and closed respectively.

3,606,682
RAZOR BLADES
Harold E. Camp and James W. Evans, Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.
Original application Oct. 30, 1967, Ser. No. 678,846, now Patent No. 3,514,856, dated June 2, 1970. Divided and this application June 26, 1969, Ser. No. 862,548
Int. Cl. B26b *25/54*
U.S. Cl. 30—346.55 **3 Claims**



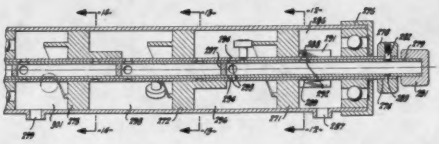
Razor blade construction having defined angular and dimensional limits of the converging surfaces forming the cutting edge and an effective recessed portion immediately adjacent thereto for improved cutting ease and shaving comfort.

3,606,683
METHOD AND APPARATUS FOR CONTINUOUSLY SEPARATING CURD AND WHEY
Jean-Louis Fernand Joux, Epinay-sur-Seine, and Maurice Blanchet, Champigny-sur-Marne, France, assignors to Fromageries Bel-La Vache Qui Rit, Paris, Seine, France
Filed Mar. 12, 1968, Ser. No. 712,541
Claims priority, application France, Mar. 15, 1967, 98,867
Int. Cl. A01j *25/00, 25/11*; A23c *19/02*
U.S. Cl. 31—46 **4 Claims**



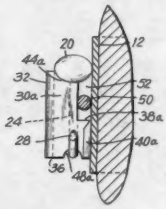
A mixture of curd and whey is continuously introduced into a decanting zone at the top of a vertical vessel. The mixture passes downward through an axial diffusing zone and whey is decanted near the top of the vessel. The curd continues downward in the vessel and enters a vertical pressing zone having a perforated wall for separation of whey remaining with the curd, and the curd is continuously extracted at the bottom of the pressing zone. A vertical washing zone may be positioned between the decanting zone and the pressing zone.

3,606,684
DISPLACEMENT ENGINE ESPECIALLY FOR DENTAL USE
Lloyd P. Flatland, 15 Quisisana Drive, Kentfield, Calif. 94904
Filed Oct. 17, 1969 ,Ser. No. 867,267
Int. Cl. A61c *1/08*
U.S. Cl. 32—26 **7 Claims**



A displacement engine has a cylinder with an axis. The cylinder is closed at one end and mounts a hollow shaft rotatable on the axis as a center and held against displacement along the axis. A piston is reciprocable in the cylinder and along the shaft by means of a sleeve cam surface at one end remote from the closed end of the cylinder and engaging a cam follower extending radially from the shaft. Pressure fluid is admitted to the cylinder adjacent the closed end. An exhaust port open through the shaft wall between the piston and the closed cylinder end is alternately opened and closed as the shaft rotates by means of an arcuate valve wall fast on the piston.

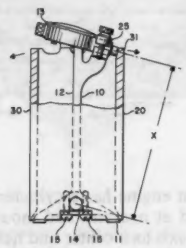
3,606,685
ORTHODONTIC APPLIANCE
Ernest Schwartz, 33—31 163rd St., Flushing, N.Y. 11354
Filed Oct. 13, 1969, Ser. No. 865,716
Int. Cl. A61c *7/00*
U.S. Cl. 32—14A **8 Claims**



An orthodontic appliance for maintaining an arch wire properly positioned with respect to a tooth. The appliance includes a symmetrically constructed guidance pin having an oval head and an elongated tail extending perpendicularly with respect to the major axis of the oval head. This pin is received in a bracket, with the tail extending between side walls of the bracket. The side walls extend substantially vertically and terminate in upper surfaces respectively formed with recesses extending around the major axis of the oval head and

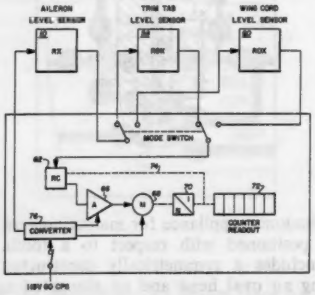
receiving the latter to form a seat therefor. The bracket side walls are formed at inner edges with upwardly directed shoulders which with the oval head and the outer surface of a band which carries the bracket define an enclosure through which the arch wire extends. When the pin is initially placed in the bracket the tail extends substantially parallel to an axis of a cylinder of which the band forms a part, with this tail being situated forwardly of the band without being inclined toward the latter.

3,606,686
ANGULAR DEVIATION GAUGE
Walter H. Righter, 12912 Malena Drive, Santa Ana, Calif. 92705
Filed July 22, 1969, Ser. No. 843,292
Int. Cl. G01b *5/20, 5/24*
U.S. Cl. 33—174 **10 Claims**



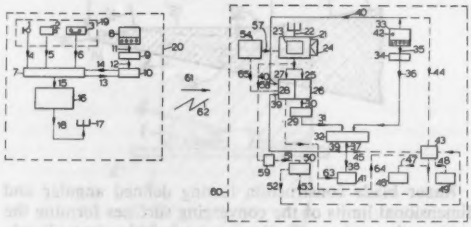
Disclosed is a measuring device for determining the angular relation between fixed surfaces. The device includes a base and a shell-like member pivotally mounted thereon. Measuring means mounted on the base determines the movement of the pivoting member with respect to the base to determine the angular relationship of the workpiece surfaces contacted by the faces of the measuring device.

3,606,687
PENDULOUS SYNCHRO LEVEL SENSOR
John N. Richardson, Hillsdale, N.J., assignor to Singer-General Precision, Inc., Little Falls, N.J.
Filed Jan. 18, 1968, Ser. No. 698,847
Int. Cl. G01c *9/16*
U.S. Cl. 33—215 **1 Claim**



A module system to determine the tilt of two planes relative to each other and to the Earth horizontal/vertical. A module is affixed to each plane, below the plane. Each module has a resolver with a pendulum attached to the resolver shaft. The output of one module resolver is fed to the other module resolver and the output of the second module resolver then provides the tilt angle.

3,606,688
METHOD AND APPARATUS FOR TEACHING A MULTIPLICITY OF STUDENTS
Jakob Zawels and Eric D. Renaud, Pretoria, Republic of South Africa, assignors to Associated Research Laboratories (Proprietary) Limited, Pretoria, Republic of South Africa
Filed July 11, 1969, Ser. No. 840,918
Claims priority, application Republic of South Africa, July 19, 1968, 68/4,656
Int. Cl. G09b *7/02*
U.S. Cl. 35—9R **15 Claims**

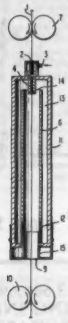


A method and apparatus for simultaneously teaching in real-time from a teaching centre a multiplicity of students located remotely from the centre. A typical teaching centre is a television studio suitably modified. There can be virtually an unlimited number of students scattered over a virtually unlimited area, the limitation being the quality of reception at a student locality. Each student is able to respond to questions which appear to him on his output means, e.g. a television screen and each obtains a personal immediate indication as to whether he is right or wrong and in some instances, the probable flaw in his reasoning if he is wrong. Typically, this is made possible by transmitting together with questions (or requests) from the teaching centre, potential responses including the correct answers to the questions, and, in some instances, several likely wrong answers to the questions, together with remarks relevant to each wrong answer. At each student locality the questions (or requests) are put to the students on their output means. The correct answers are, however, hidden from the students and are used for comparing with each student's response. The result of the comparison is used to give the appropriate information to the student.

3,606,689
APPARATUS FOR HEAT TREATMENT OF FILAMENT
Tatsuki Matsuo, Takashi Fukuda, Shosuke Nanri, Katsuya Ishitobi, Ryunosuke Masuda, and Hiroshi Okano, Otsu-shi, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka-shi, Osaka-fu, Japan
Filed Feb. 20, 1969, Ser. No. 801,092
Claims priority, application Japan, Feb. 20, 1968, 43/11,001; Feb. 26, 1968, 43/12,454; Aug. 13, 1968, 43/57,847
Int. Cl. F26b *13/10*
U.S. Cl. 34—155 **6 Claims**

An apparatus for treatment of filament in the relaxed state with hot gas stream which comprises a heating

cylinder, an inlet portion for the filament provided at one end of the cylinder, an outlet for the filament provided at the other end, and an inlet for a secondary gas stream provided near the inlet portion, the filament being joined

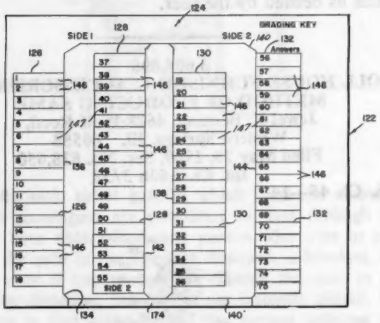


by the primary gas stream at the inlet portion and then introduced through the inlet portion into the cylinder. By the use of such apparatus, a filament can be heat-treated in the relaxed state at a high efficiency of operation.

ERRATUM

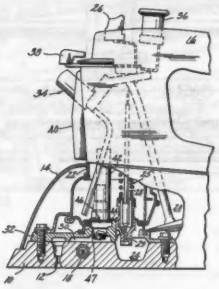
For Class 35—9 see:
Patent No. 3,606,688

3,606,690
TEST CORRECTING AND SCORING DEVICE
Robert H. Murray, 800 North West St., Alexandria, Va. 22314
Filed July 18, 1969, Ser. No. 842,922
Int. Cl. G09b *3/00*
U.S. Cl. 35—48A 19 Claims



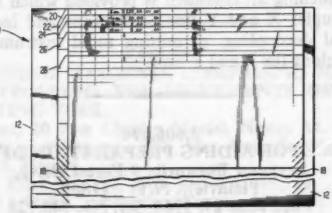
A test scoring device comprising an answer card and a grading card; one of the cards overlying the other of the cards; one of the cards being larger in width than the other of the cards; including a guide line on one of the cards for longitudinally positioning the other of the cards thereon; the other of the cards when underlying the one of the cards having a margin extending beyond at least one of the side edges on the one of the cards; the cards including horizontal aligning means for cooperatively horizontally aligning the one of the cards with the other of the cards; the aligning means including parallel lines on at least one of the cards coinciding with the parallel lines on the other card.

3,606,691
STEAM-POWERED SPRAY IRON
William E. Davidson, Ontario, and Kaj Toft, Upland, Calif., assignors to General Electric Company
Continuation-in-part of application Ser. No. 23,884, Mar. 30, 1970. This application June 18, 1970, Ser. No. 47,229
Int. Cl. D06f *75/06*
U.S. Cl. 38—77.5 9 Claims



The invention discloses a steam-powered spray iron which uses a pressure regulating valve between the water tank and steam generator for maintaining a substantially uniform steam pressure in the generator for operating the spray. The pressure regulating valve is improved to increased reliability, to reduce the number of parts, the overall height, and the cost of the iron.

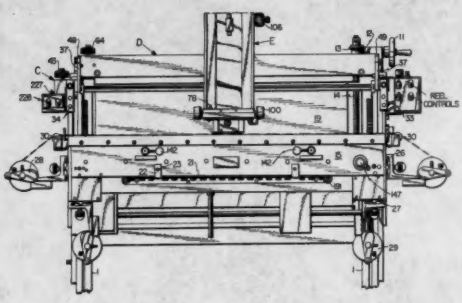
3,606,692
INFORMATION STORAGE AND DISPLAY SYSTEM
Robert A. Rivers, 52 Orlando Ave., Winthrop, Mass. 02152
Filed Dec. 9, 1969, Ser. No. 883,409
Int. Cl. G09f *3/10*
U.S. Cl. 40—10 4 Claims



An information storage and display system including a carrier having a pair of columns of vertically spaced slits and a plurality of cards the lower corners of which removably project through a set of slits. Each of the cards includes a number of information lines and the cards are assembled on the carrier such that a desired

number of lines of each card and the information contained thereon are visibly displayed. The cards are locked in place on the carrier in the desired pattern to prevent any card from being inadvertently lost from the carrier.

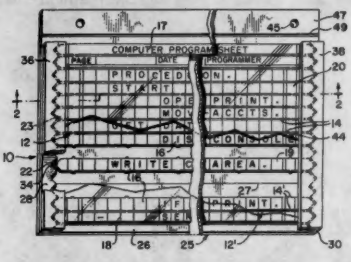
3,606,693
FILM VIEWING MEANS
David D. Grimes, Fairfax, and Earl E. Kasdorf, Falls Church, Va., assignors to The Richards Corporation, McLean, Va.
Filed Mar. 10, 1969, Ser. No. 805,491
Int. Cl. G09f *11/28*
U.S. Cl. 40—31 **22 Claims**



A film viewing means for viewing large films for interpretation, especially stereo interpretation, of aerial photographs and the like which includes a film handling table containing illumination means that produce optimum light intensity over prolonged periods of time via oil immersed light tubes, a shiftable viewing stage and associated film transport means including a compact film loop take-up arrangement which in cooperation with the shiftable stage provides all possible film threading configurations. A master overhead carriage system is included that features a quick release coupling between an X travel unit and a Y travel unit, and a Z travel instrument carrying unit on the X travel unit having a rotary instrument supporting ring. The mounting and feed arrangement for the carriage and associated instrument carrying unit is provided which produces zero backlash in X, Y and Z travels, provides for coarse and fine adjustments in the Z travel via a gravity feed, thus preventing feeding of the instrument into the stage while permitting rapid instrument elevation, and a manually operated clamp or lock is included for adjusting the instrument around the Z axis. Further an electrical clutching arrangement is provided which automatically couples X and Y fine feed means and includes an electrical decoupling, permitting rapid instrument positioning along the X and Y axes.

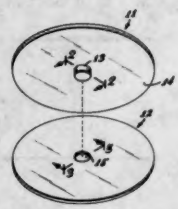
3,606,694
DEVICE FOR AIDING PREPARATION OF LISTS
Seymour Bosworth, 9 Forest Drive, Plainview, N.Y. 11803
Filed June 27, 1968, Ser. No. 740,726
Int. Cl. G09f *9/00*
U.S. Cl. 40—63 **4 Claims**

A device for aiding preparation of lists such as computer programs, directories, registers and the like in the form of a sheet separable along scored, parallel, transverse lines into a multiplicity of narrow strips. A flat, rectangular frame holder is provided for holding a complete sheet or a sheet divided into any number of parts or individual strips. Opposite ends of each strip are shaped to detachably engage with correspondingly shaped lateral marginal side pieces or portions of the holder. The holder is reusable



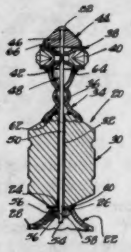
any desired number of times for different replacement sheets.

3,606,695
ROTARY INDEXING INDICIA-CARRYING MECHANISM
Lloyd L. Robbins, 1627 South 13th East, Salt Lake City, Utah 84105
Filed Dec. 12, 1968, Ser. No. 783,272
Int. Cl. G09f *11/04*
U.S. Cl. 40—70R **1 Claim**



Disclosed is indicia displaying apparatus comprising a pair of disks at least one of which is transparent having sandwiched therebetween indicia-carrying means. The disks are rotatable with respect to each other and by such rotation the indicia-carrying means is manipulated so as to selectively display a predetermined portion of said indicia as desired by the user.

3,606,696
DOLL HOUSE FURNISHING ACCESSORIES AND METHOD OF PRODUCING SAME
Jewel E. Berman, 4628 Wolf Road, Western Springs, Ill. 60558
Filed May 28, 1969, Ser. No. 828,650
Int. Cl. A63h *3/52*
U.S. Cl. 46—14 **9 Claims**



Miniature furnishing accessories are produced by assembling a plurality of bead-like elements on a straight

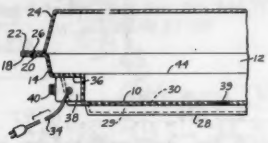
headed pin to provide the desired configuration of a bottle, lamp, dish and the like. Glue is applied between the elements and the pin whereupon an end of a pin is forced into a mounting board to clamp the elements together until the glue is dried. Thereafter, the excess length of the pin is removed.

3,606,697

TRAY FOR SEED GERMINATION AND THE LIKE

Douglas H. Eden, Harmony, Pa., assignor to F. B. Leopold Co., Inc., Zelienople, Pa.

Filed Aug. 22, 1969, Ser. No. 852,159
Int. Cl. A01g 9/24
U.S. Cl. 47—17 **6 Claims**



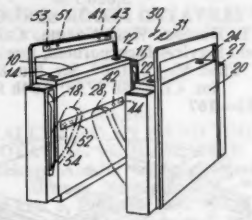
The invention pertains to a tray for use in connection with seed germination and plant growth and takes the form of a container formed of reinforced polyester resin with an electric heating element embedded in the bottom wall for supplying heat to a medium contained in the tray. Controls for the heating element are mounted in a recess on an end wall of the tray and the side walls of the tray inclined outwardly so the trays can be stacked when not in use.

3,606,698

AUTOMATIC TICKET GATE

Toshio Tanaka and Keisuke Osaki, Kyoto, and Tokio Hosoda, Ibaragi, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed June 3, 1969, Ser. No. 829,891
Claims priority, application Japan, June 14, 1968, 43/41,260
Int. Cl. E05b 65/00
U.S. Cl. 49—35 **6 Claims**



An automatic ticket gate in which once the direction in which passengers are permitted to pass through the gate has been determined, any person who tries to pass through the gate in the opposite direction is blocked, but wherein even if any person has entered the gate in the impassable direction, the gate is not instantly closed, but a warning is first given and if the person noticing the warning turns back, the gate is kept open for passengers to come in.

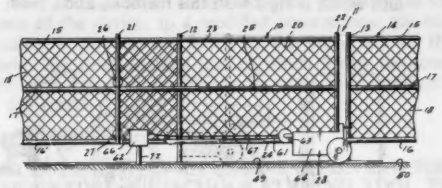
3,606,699

GATE CONTROL DRIVE UNIT

John J. Robinson, Jr., Box 1015, Fabens, Tex. 79838

Filed Sept. 16, 1969, Ser. No. 858,383
Int. Cl. E05f 15/14
U.S. Cl. 49—280 **3 Claims**

A sliding gate structure supported at one end by rollers engaging tracks on a fence structure and at the other end by a drive unit having a reversible electric motor driving a ground engaging wheel and a second grooved wheel riding on a track disposed across the opening in the fence structure. The drive unit is rigidly attached to the



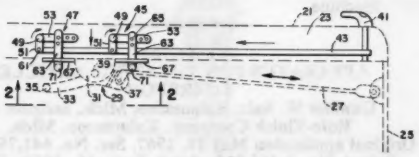
gate and supports the other end and provides a mounting surface for a solenoid actuated latching device which engages a latch member attached to a gate post of the fence to hold the gate in the closed position.

3,606,700

DOOR LOCKING AND UNLOCKING APPARATUS

Earl Eugene Davis, Box 21, Guernsey, Wyo. 82214

Continuation-in-part of abandoned application Ser. No. 776,544, Nov. 18, 1968. This application Oct. 24, 1969, Ser. No. 871,508
Int. Cl. E05b 65/06
U.S. Cl. 49—394 **26 Claims**



This disclosure described an apparatus for aiding the locking or unlocking of a door closed and opened by an off-center mechanism. The apparatus includes a lockable door handle mounted outside of the door to be locked. The lockable door handle is connected by a control rod or a flexible cable to a bell crank or cam mechanism. Attached to the bell crank or cam mechanism is a slideable rod, strap, or plate. The bell crank or cam mechanism is rotated when the control rod is moved by the rotation of the lockable door handle. When the bell crank mechanism is rotated, the slideable rod, strap or plate is moved toward the off-center mechanism. The ends of the rod, strap or plate include rubber bumpers which impinge on the handle of the off-center mechanism and move it from its off-center locked position or its off-center unlocked position as the case may be. Thereafter, the door can be unlocked or locked by simply pushing it open or closed as desired.

3,606,701

SECTIONING MACHINES COMPRISING MEANS CONTROLLING THE MOVEMENTS OF THE CUTTING TOOL

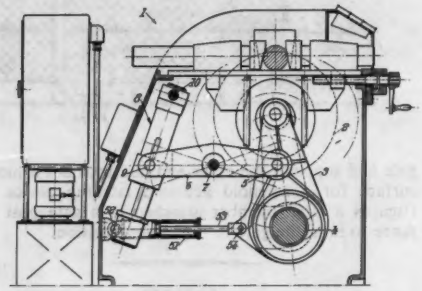
Jean Favot, 20 Rue Charles Martel, Nancy 54, France, and Rene Willaume, 163 bis, Rue de Vaugirard, Paris 75, France

Filed Mar. 11, 1969, Ser. No. 806,110
Claims priority, application France, Mar. 12, 1968, 143,413
Int. Cl. B24b 27/06
U.S. Cl. 51—98 **15 Claims**

The infeed of the cutting tool in a sectioning machine is controlled by a hydraulic unit constituted by

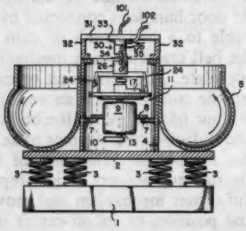
(a) a "cutting" unit of which the two elements (piston, cylinder) are movable, but one of which is rigid with a mechanical member controlling the movements of the cutting tool,

(b) a depth of cut "regulating" unit of which the two elements are movable, one of these elements being movable through the intermediary of a one-way abutment by that of the elements of the "cutting" unit which is rigid with this member, and



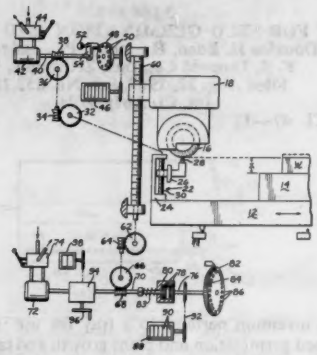
(c) an "approach" unit, one element of which is movable and rigidly connected to the two movable elements of the other units, other than those which may make a one-way abutment and of which the other element is connected to the frame of the machine.

3,606,702
APPARATUS FOR TREATING ARTICLES THEREFOR
Gunther W. Balz, Kalamazoo, Mich., assignor to Roto-Finish Company, Kalamazoo, Mich.
Original application May 29, 1967, Ser. No. 641,762, now Patent No. 3,466,815, dated Sept. 16, 1969. Divided and this application Jan. 8, 1969, Ser. No. 789,904
Int. Cl. B24b *31/06;* **F16h** *33/02*
U.S. Cl. 51—163 **9 Claims**



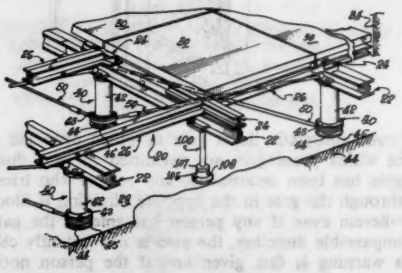
Novel method for treating articles, e.g., finishing metal parts, by introducing the articles into a treating zone, if desired together with treating material, moving the articles in an orbital path and, while continuing orbital movements, subjecting the articles to periods of increased and decreased velocity of linear processional motion in a direction substantially perpendicular to the plane of orbital motion, thereby facilitating control of dwell time within the treating zone and facilitating discharge of articles from the treating zone. Apparatus for carrying out said method, e.g., a finishing machine, comprising a curvilinear trough, e.g., annular or helical, resiliently mounted for vibration, having a vertically mounted vibratory motor provided with eccentric weights on its shaft, and including means for changing phase relationship between the eccentric weights while the vibratory motor is in operation, thereby increasing and decreasing the linear processional motion along the chamber for attaining the desired results already stated is claimed.

3,606,703
APPARATUS FOR GRINDING
Frederick G. Krafft, 2975 Fox Hollow Road, and William G. Baldenhofer, 4222 Grant Road, both of Springfield, Ohio 45502
Filed May 12, 1969, Ser. No. 823,788
Int. Cl. B24b *49/18*
U.S. Cl. 51—165 **11 Claims**



The invention relates to a grinding machine having a wheel truing device mounted on the grinding machine table that supports the workpiece with a mechanism for raising or lowering the truing tool of the device and having an indicating counter connected with the driving mechanism to indicate the elevation of the truing tool. The grinding wheel also has a mechanism for moving it vertically and has a counter connected with the mechanism to indicate the elevation of the grinding wheel. Both of the counters are driven through clutch devices that will permit adjustment of the counters relative to each other so that the absolute position of the grinding wheel relative to the surface to be ground thereby can be indicated on its counter.

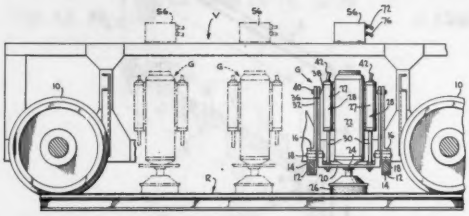
3,606,704
ELEVATED FLOOR STRUCTURE
Clyde T. Denton, West Covina, Calif., assignor to Resilient Services Incorporated, Los Angeles, Calif.
Filed May 2, 1969, Ser. No. 821,396
Int. Cl. E04b *1/98;* **E04h** *9/02*
U.S. Cl. 52—167 **10 Claims**



This elevated floor structure comprises a rigid frame carrying the floor proper and supported above the subfloor by a plurality of springs that are vertically compressible to accommodate local deformations of the subfloor. Each spring unit is mechanically prevented from expanding beyond a predetermined length, representing prestressing of the spring to a force that is related to the anticipated total load. The floor proper comprises individual cast metal panels coated with seamless, electrically insulating, resilient material. Special tie-rod

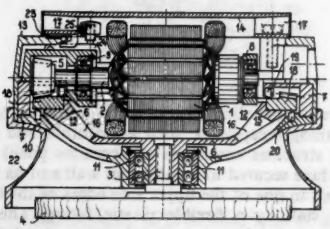
brackets, resilient tie-down links and adjustable shims, are described. A modified structure, suitable for missile launching installations and the like, accommodates large amplitude vibrations by permitting the entire floor frame to move both horizontally and vertically with respect to the subfloor, with displaceable perimeter panel structures between the floating floor and the building sidewalls. The floor frame is yieldably urged toward normal position in response to both gravity and resilient forces.

3,606,705
RAIL GRINDER
Albert Rivoire, North Syracuse, N.Y., assignor to Frank Speno Railroad Ballast Cleaning Company, Inc., Ithaca, N.Y.
Filed July 30, 1969, Ser. No. 845,952
Int. Cl. B24b *23/00*
U.S. Cl. 51—178 10 Claims



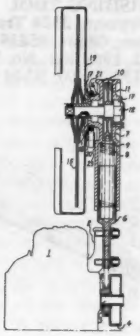
A grinding head including a rotary grinding wheel is supported from a vehicle for movement along and in grinding engagement with a rail. A portion only of the weight of the grinding head is supported from the vehicle by fluid pressure means including an expansible chamber the volume of which varies with variations in the operating level of the grinding head. The unsupported weight of the grinding head is applied as operative pressure of the grinding wheel against the rail. A pressure control unit in communication with the expansible chamber automatically varies the pressure of fluid in such chamber as the grinding head deviates from a predetermined operating level to abruptly increase the operating pressure as the grinding head falls below said level and to abruptly decrease such pressure as the grinding head rises above such predetermined level.

3,606,706
ELECTRICALLY-DRIVEN HAND TOOL WITH ROTATING TOOL MEMBER
Josef Geimer, Amalia van Solmsstraat 31, Drunen, Netherlands
Filed Feb. 6, 1969, Ser. No. 797,112
Claims priority, application Germany, Feb. 8, 1968, P 16 52 051.7; Dec. 28, 1968, P 18 17 333.6
Int. Cl. B24b *23/00*
U.S. Cl. 51—170T 10 Claims



In an electrical hand tool having a rotating tool member (grinding, polishing, etc. wheel) and including a speed reduction gearing betwen the motor and tool shafts, the gearing consists of a dish-shaped carrier fitted at its outer end with bevel gear teeth meshing with a bevel pinion fast with the motor shaft. The carrier forms a shroud closely enveloping a part of the motor and having its inner and connected to the tool shaft journalled in the frame of the device. In a modified construction, the tool member is directly connected to the inner end of the carrier the outer toothed end of which forms the inner race of a ball bearing having an outer race connected to the frame.

3,606,707
ARRANGEMENT AT AN ENGINE CHAIN SAW FOR MOUNTING A CIRCULAR CUTTING TOOL TO THE FRAME OF CHAIN SAW
Ulf Vilhelm Naslund, Huskvarna, Sweden, assignor to Husqvarna Vapenfabriks Aktiebolag, Huskvarna, Sweden
Filed Jan. 17, 1969, Ser. No. 792,085
Claims priority, application Sweden, Jan. 18, 1968, 691/1968
Int. Cl. B24b *19/00*
U.S. Cl. 51—241 4 Claims

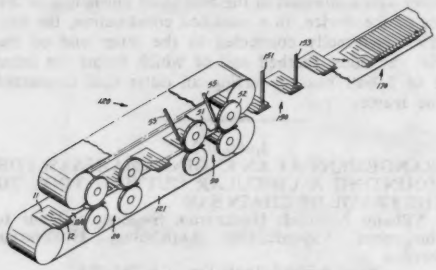


There is provided a device in motor saws by which a circular shaped cutting tool can be attached to the frame of said saw; said device including an arm which projects outwardly from the frame and which carries a shaft driven by the motor and forming the rotary shaft of the cutting tool; and in which the rotary shaft of the tool is journaled perpendicularly to the arm in a bearing capable of being turned round the longitudinal direction of the arm, and supplied with a locking device, and wherein the rotary shaft can be adjusted to and locked in any angular position, in a plane through the bearing perpendicular to the arm, and wherein a cover plate arranged concentrically to the rotary shaft and at least partly enclosing the tool is capable of being rotated perpendicularly to the rotary shaft and is provided with a locking device.

3,606,708
ROLLING AND BURNISHING OF CONTACT SURFACES
George J. Plichta, Fords, and Hans Weller, Roselle Park, N.J., assignors to Western Electric Company, Incorporated, New York, N.Y.
Filed Jan. 7, 1969, Ser. No. 789,580
Int. Cl. B24b *1/00*
U.S. Cl. 51—323 3 Claims

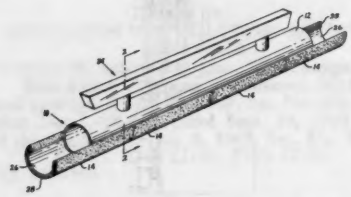
Method and apparatus for smoothing metal coated surfaces by successive rolling and burnishing operations. The apparatus performs rolling and burnishing operations automatically, using hard polished rollers and a flexible

burnishing wheel having automatic compensation for wheel wear. The workpiece is advanced through the rolling and burnishing stations by two opposed conveyor



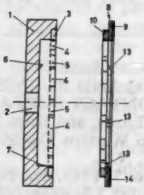
belts which grip the pieces therebetween with the portion to be rolled and burnished protruding to one side of the belts.

3,606,709
FINISHING TOOL
James H. Countryman, 3324 Trailon Road, Dayton, Ohio 45439
Filed Apr. 22, 1968, Ser. No. 722,885
Int. Cl. B23d *71/00;* **B24d** *9/02*
U.S. Cl. 51—375 **24 Claims**



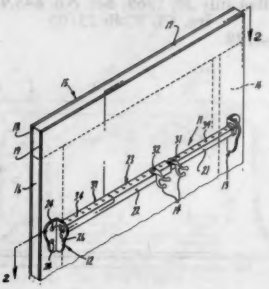
Several abrading tool assemblies are disclosed each having a finishing shoe resiliently and detachably clipped onto a tubular holder.

3,606,710
GRINDING WHEEL AND LUBRICANT ARRANGEMENT
Henri Juillerat, 9 Rue du Chanet, 2014 Bole, Switzerland
Continuation of application Ser. No. 653,557, July 14, 1967. This application May 11, 1970, Ser. No. 37,401
Claims priority, application Switzerland, July 26, 1966, 10,803/66
Int. Cl. B24b *55/02*
U.S. Cl. 51—356 **5 Claims**



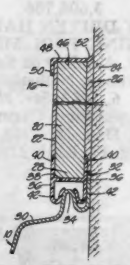
A grinding wheel assembly is provided with a plurality of individual lubricating chambers which supply a fluid lubricant to the grinding surface of a grinding disc during a grinding operation. The lubricating chambers are formed by a plurality of wedge-shaped ribs on a support plate cooperating with a plurality of wedge-shaped projections on a grinding plate and during rotation of the grinding wheel, the fluid lubricant is centrifuged to the grinding surface through holes in the grinding disc in fluid communication with the lubricating chambers.

3,606,711
TELESCOPIC DOOR HANGER
Frank J. Lodato, 83 Spencer Lane, Atherton, Calif. 94025
Filed Mar. 17, 1969, Ser. No. 807,535
Int. Cl. A47h *1/08;* **E04c** *2/28, 2/34*
U.S. Cl. 52—27 **6 Claims**



An adjustable door hanger including a telescoping rod assembly, mounting brackets, and hooks removably mounted on the rod. The mounting brackets enable the hanger to be secured to a solid structure, even though the hooks themselves are mounted over a surface which could not otherwise support them.

3,606,712
WALL PANELING STRUCTURE FOR BATHING RECEPTACLES
Richard H. Moir, San Diego County, Calif., assignor to Hemisphere Industries, Incorporated, Las Vegas, Nev.
Filed May 1, 1969, Ser. No. 820,967
Int. Cl. A47k *3/16*
U.S. Cl. 52—35 **1 Claim**



A decorative paneling structure for covering the walls around bathing receptacles, such as bathtubs and shower stalls. The structure comprises a decorative panel having its rear surface secured to a bathroom wall and its bottom edge secured to one of the upper side edges of the bathtub or shower stall by a flexible plastic fitting. The fitting provides a water-tight connection between the decorative panel and the bathtub, and is made of a springy plastic material having a memory. The fitting comprises a pair of substantially parallel side walls having their center portions

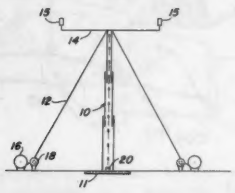
connected by an integral web. The side walls of the fitting have upper portions which cooperate with the integral connecting web to form a generally U-shaped channel for snugly receiving the bottom edge of the decorative panel, and deformable lower portions which are turned inwardly for snugly receiving an upwardly protruding, longitudinally extending bead along the upper side edge of the bathtub. A flexible plastic covering strip is provided across the top edge of the decorative panel and bears against the wall to which the panel is secured to form a moisture-proof seal between the top of the panel and the wall.

3,606,713

REMOTE CONTROL FOR COLLAPSIBLE TOWERS

Ernest M. Runquist, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Oct. 24, 1969, Ser. No. 869,031
Int. Cl. E04h *12/18, 12/34*
U.S. Cl. 52—115 **1 Claim**



A mast consisting of two or more telescoping tubes stands vertically and is guyed with cables. A hydraulic or pneumatic system raises and lowers the mast, winches with slip clutches being used to play out the guys. A vertical laser beam centered in the mast signals the operator when the mast tilts off the vertical.

ERRATUM

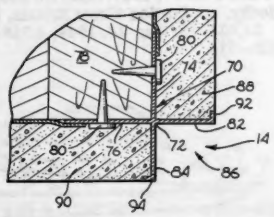
For Class 52—167 see:
Patent No. 3,606,704

3,606,714

MOLDING STRIP FOR USE AS QUIRK OR REVEAL

Robert W. Arnett, Pasadena, Calif. (% Fry Reglet Corp., 3028 Dolores St., Los Angeles, Calif. 90065)

Continuation-in-part of application Ser. No. 747,385, July 24, 1968. This application Nov. 5, 1969, Ser. No. 874,328
Int. Cl. E04b *1/70;* E04f *19/04*
U.S. Cl. 52—255 **16 Claims**



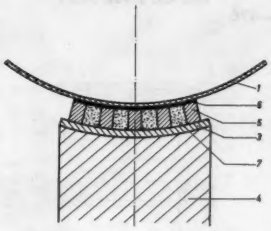
An extruded molding strip is fitted near or at a corner of a structural base to form a quirk or reveal, eliminating the task of joining similar or dissimilar finish materials at a corner, and at the same time providing an attractive decorative effect.

3,606,715

SPHERICAL STORAGE TANK FOR GASES AND LIQUIDS AND SUPPORTING BASE THEREFOR

Walter Wyss, Pratteln, Switzerland, and Peter Feuerlein, Redingstr. 12, Basel, Switzerland

Continuation-in-part of application Ser. No. 706,518, Feb. 19, 1968. This application Nov. 7, 1969, Ser. No. 874,901
Int. Cl. B65d *87/04;* E02d *27/28*
U.S. Cl. 52—294 **5 Claims**



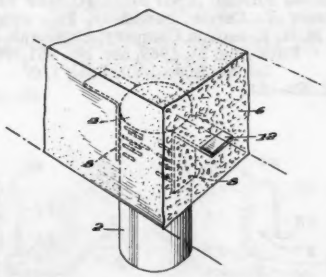
A mounting for a spherical tank holding gases or liquids which is supported on a rigid concrete foundation in a region of the vertical axis of the tank, the mounting consisting essentially of a spaced array of support elements of cellular or sponge structure, such as neoprene or Buna N rubber within a matrix of stiff plastic filler which is elastic and non-hardening, such as a quick-setting epoxy resin or polyethylene sulfide filling material which contains a high proportion of filler. The upper surface of the array of cellular elements and matrix is coated with a bonding adhesive to adhere the mounting to the steel surface of the tank, preferred adhesives being a thermosetting polyethylene sulfide adhesive or a thermosetting epoxy resin. The lower surface of the array is coated with the same bonding adhesive to secure the array to the concrete foundation.

3,606,716

TIMBER PILING CONSTRUCTION

David R. Norcross, Washington, D.C., and Hubert T. Dudley, Arlington, Va., assignors to Timber Engineering Company, Washington, D.C.

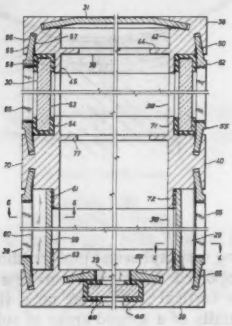
Filed July 31, 1969, Ser. No. 846,510
Int. Cl. E04c *3/34;* E02d *5/54*
U.S. Cl. 52—301 **5 Claims**



A timber piling construction including an upright timber pile and a concrete slab supported on the upper end of the pile. A pair of connector plates are rigidly secured on opposite sides of the pile. The connector plates are in the shape of an angle with one leg having a plurality of nail

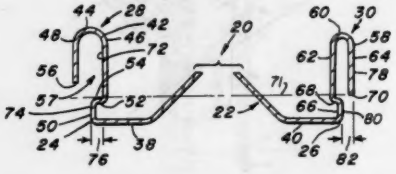
holes for receiving nails driven into the wood pile. The other leg of the connector projects outwardly at the upper end of the pile. Concrete is cast over the connector and the upper end of the pile to form a unitary structure.

3,606,717
PANEL MOUNTING APPARATUS
Buell Moore, Houston, Tex., assignor to Esquire, Inc., New York, N.Y.
Filed Apr. 10, 1969, Ser. No. 815,167
Int. Cl. E06b 3/54
U.S. Cl. 52—476 11 Claims



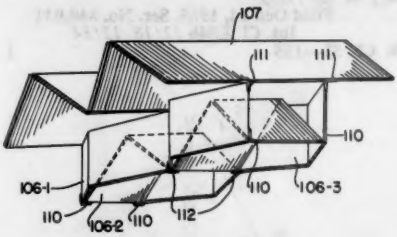
Apparatus for mounting a removable panel comprising a frame including a plurality of frame members forming the sides of the frame and connected together at the corners of the frame. Each frame member has a main body and a flange extending from the inner side of the main body to provide a supporting surface for a side edge of the panel. There is a slot in the main body of each frame member having opposite walls extending at an acute angle to and from its inner to its outer portion in direction away from supporting surface. Each of a plurality of bars equal in number to the frame members has opposite side walls slidably engageable with the side walls of the slot for insertion therein and another side wall extending at an acute angle to the opposite side walls for bearing on and urging the side edge of the panel against the supporting surface of the frame member.

3,606,718
BUILDING PANEL AND SIDE JOINTS THEREFOR
Bernard E. Curran, Sewickley, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.
Filed Aug. 21, 1969, Ser. No. 851,799
Int. Cl. E04c 1/10; F16b 5/07
U.S. Cl. 52—542 14 Claims



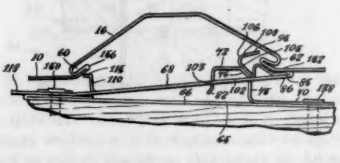
A building panel having a central pan of desired profile and improved marginal connecting means along opposite pan edges, providing an improved side joint between adjacent ones of the building panels. Both marginal connecting means comprise upstanding U-shaped channels. One channel is adapted to fit within the other channel to provide a gasket-free, essentially weather-tight joint having an interlock to prevent disengagement.

3,606,719
ERECTABLE STRUCTURES
Thomas G. Berry, Washington, D.C., assignor to Fairchild Hiller Corporation, Hagerstown, Md.
Continuation of application Ser. No. 432,780, Feb. 15, 1965. This application July 12, 1968, Ser. No. 752,436
Int. Cl. E04b 1/34, 12/18, 7/16
U.S. Cl. 52—632 5 Claims



An erectable structure formed by one or more units having at least two connected support members. Each of the support members is in turn formed by a plurality of foldable panels. In the collapsed or folded condition the structure occupies a height equal substantially to the sum of the thicknesses of the total number of panels forming the support member on one side of the structure and each support member occupies an area substantially equal to the area of one of its folded panels. When unfolded or deployed, the panels of each support member are extended and lock together to form a structure which is substantially rigid along its longitudinal axis and in a direction transverse thereto. The erected structure also has a relatively large surface area which is substantially equal to the sum of the areas of the individual panels forming the support members.

3,606,720
ROOFING AND SIDING SHEETS AND THE LIKE AND FASTENING MEANS THEREFOR
William Cookson, Fareham, England, assignor to Cookson Sheet Metal Development Limited, Southampton, England
Filed Feb. 17, 1969, Ser. No. 800,835
Claims priority, application Great Britain, May 20, 1968, 24,021/68; Jan. 28, 1969, 4,768/69
U.S. Cl. 52—714 10 Claims

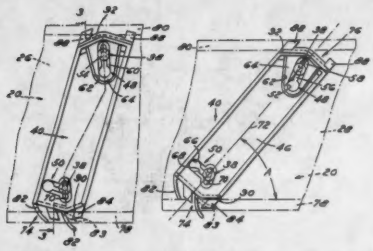


A roofing sheet having wide-based ribs, a lateral male rib having means for interlocking with an overlying lateral

female rib of a neighbouring sheet, the male rib having a fixing channel for securing the rib to a structural member. There are also described clips to act as concealed fixings for intermediate widebased ribs, the clips having means to engage an internal pocket or pockets in the rib.

3,606,721
MOLDING ASSEMBLY AND ADAPTOR AND METHOD

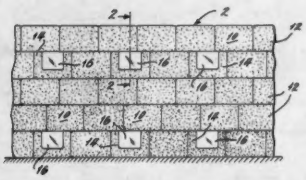
Engelbert A. Meyer, Union Lake, Mich., assignor to Warren Fastener Corporation, Mount Clemens, Mich.
Filed Nov. 5, 1969, Ser. No. 874,133
Int. Cl. B60r 13/04; E04f 19/02
U.S. Cl. 52—718 5 Claims



The molding assembly disclosed herein is adapted to securing tapered moldings to a support. The assembly includes a plurality of studs secured to the support in angularly related, substantially equally spaced pairs, with the angle proportional to the width of the molding. An adaptor is secured to the support by each pair of studs and is positioned at an acute angle by the studs with the greatest angle located at the widest portion of the molding. The disclosed embodiment of the adaptor includes a pair of generally perpendicular key hole slots, one of which is T-shaped, to permit vertical adjustment of the molding after securement. The method of assembly includes securing a plurality of studs to the support in a pattern of pairs, as described hereinabove, securing an adaptor to each pair of studs and receiving the molding over the adaptors and securing the molding in place.

3,606,722
REFRACTORY WALL

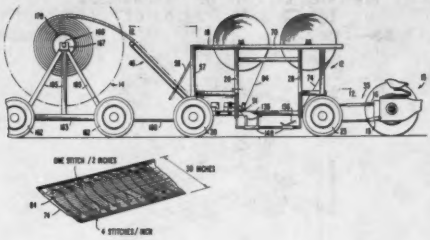
William D. Fitzpatrick, Mexico, Mo., assignor to A. P. Green Refractories Co., Mexico, Mo.
Filed Apr. 23, 1969, Ser. No. 818,659
Int. Cl. E04b 1/76; E04g 21/14
U.S. Cl. 52—747 3 Claims



A refractory wall is constructed from a plurality of plastic blocks laid into multiple courses. Most of the blocks are formed entirely from a plastic refractory material, while the remaining blocks are formed from the same plastic material but have non-deformable anchor cores embedded in them. Each anchor core is created from a refractory material which does not impair the refractoriness of the plastic refractory material.

3,606,723
METHOD AND APPARATUS FOR HARVESTING AND HANDLING CROPS

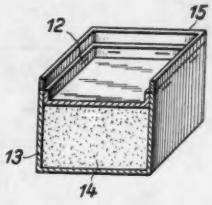
Emmett T. Clark, Durham, N.C., assignor of a fractional part interest to James J. Shanley, Bethesda, Md.
Continuation-in-part of application Ser. No. 661,641, Aug. 8, 1967, now Patent No. 3,470,882, dated Oct. 7, 1969. This application Apr. 10, 1969, Ser. No. 814,963
Int. Cl. B65d 9/02, 63/04, 67/00
U.S. Cl. 53—21FW 20 Claims



A method and apparatus for harvesting leafy crops in which an elongated web means of flexible porous sheet material is moved along past a harvesting station at which harvesters lay harvested crop material on the web means, the harvested crop material is conveyed on the moving web means to a point where the harvested crop material and the web means may be connected together to integrate the two and thereafter the harvested crop material can be handled in conjunction with handling of the web means. The invention also envisages overlaying a second elongated web means of flexible porous sheet material on top of the harvested crop material deposited on the first web means, connecting marginal portions of the first and second web means to envelope the harvested crop material and if desired connecting the first and second web means at spaced points intermediate the longitudinal marginal portions to stabilize the harvested crop material relative to the enveloping web means to facilitate further handling of the harvested crop material. The invention further envisages treating the harvested material in any case by suspending or reeling the elongated web means and the enveloped harvested crop material.

3,606,724
METHOD FOR FORMING A CLOSED CARDBOARD CONTAINER

Hans Otto, Hamburg-Grossflottbek, Stockkamp 2, Germany
Filed Aug. 14, 1969, Ser. No. 850,173
Claims priority, application Germany, Aug. 16, 1968, P 17 86 091.2
Int. Cl. B65b 7/28
U.S. Cl. 53—24 3 Claims



A method of joining a container, particularly one made of cardboard, to its lid, and apparatus therefor. The lid is turned upside down and inserted into the container with

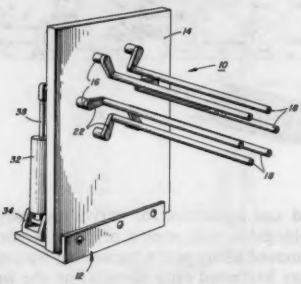
lid flanges engaging the inside container walls. Joining is preferably effected by fastening means. The apparatus includes a frame, a lifting table, locking devices and separating devices.

3,606,725

METHOD OF AND APPARATUS FOR COMPRESSING A VOLUME OF MATERIAL TO BE PACKAGED

Hugh C. Dugan, Nutley, N.J. (Carlee Corporation, P.O. Box 26, Northvale, N.J. 07647)

Filed Oct. 22, 1969, Ser. No. 868,352
Int. Cl. B65b *1/24, 63/02*
U.S. Cl. 53—24 8 Claims



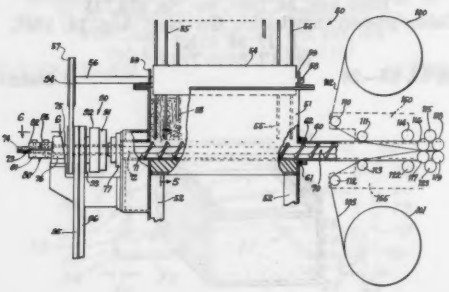
A volume of material to be packaged, e.g. high loft material of the type having a high volume per unit weight characteristic, is disclosed as being packaged by compressing the material through the exertion of compressive forces thereon by a plurality of revolving compression tubes, maintaining the material in compressed condition while passing a packaging device such as a bag therearound, and concurrently removing both the compressed material and the packaging device from the compressing means, the packaged material being of a volume less than the volume of the material prior to packaging.

3,606,726

METHOD AND MACHINE FOR MAKING DUNNAGE DEVICES

Maurice Spertus, Highland Park, and Charles K. Goldberg, Chicago, Ill., assignors to Intercraft Industries Corporation, Chicago, Ill.

Filed Aug. 7, 1969, Ser. No. 848,150
Int. Cl. B65b *9/12, 13/20*
U.S. Cl. 53—28 15 Claims



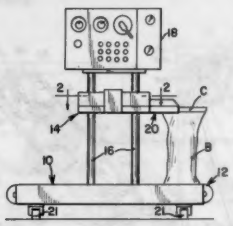
There is disclosed a machine and a method for utilizing waste paper products and the like by stuffing the same into a flexible tubing to form perforated dunnage links. The dunnage links are used separately or joined together to form a mat. The dunnage links are made, one after another, by transporting flexible tubing while encircling a hollow mandrel and simultaneously transporting the waste products through the mandrel and into the tubing. After a predetermined length of filled tubing is formed, it is sealed and severed.

3,606,727

PLASTIC BAG SEALER

William Lourdes Davis, Davenport, Iowa, assignor to The Kartridg Pak Co., Davenport, Iowa

Filed July 7, 1969, Ser. No. 839,302
Int. Cl. B65b *57/00, 51/20*
U.S. Cl. 53—52 10 Claims



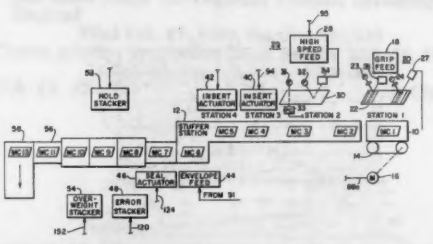
A machine for heat sealing the tops of plastic bags which are either plain, flat folded, or gusset-type, the machine being characterized by hot air sealing nozzles and associated electric heaters positioned at a seal forming station along the path traversed by co-operating runs of parallel, endless traveling conveyor belts which grip the folded or closed tops of the bags adjacent the seal forming area and advance with the same past the seal forming station to a seal cooling station where cold air nozzles set the seal, with the bags being carried on a supporting conveyor and with means for controlling the speed of the bag supporting and top gripping conveyors which is responsive to a thickness sensing means to automatically slow down the travel of the bag past the seal forming station when a thicker portion of the bag, such as a gusseted portion, reaches the seal forming station.

3,606,728

INSERTION MACHINE

Eugene Sather, Washington, and Lester H. Stocker, Phillipsburg, N.J., and Kenneth A. Hams, Easton, Pa., assignors to Bell and Howell Company, Phillipsburg, N.J.

Filed Sept. 8, 1969, Ser. No. 855,805
Int. Cl. B65b *57/04*
U.S. 53—54 24 Claims



A selective insertion machine has a first document feeder for delivering main documents onto a first portion of an insertion track at the rate of at least one such main document for each machine cycle. A second document feeder contains sets of subordinate documents wherein each set is associated with a given main document. The

second document feeder operates at a high speed so as to feed an entire set of subordinate documents during a given machine cycle and place that set on the insert track with the previously fed associated main document. The main documents contain count indicia representative of the number of associated subordinate documents that are to be subsequently fed by the high speed feeder. These indicia are sensed along with control indicia and representative count and control signals are generated. The associated subordinate documents are then counted as they are fed from the high speed feed and a comparator compares the two counts to generate an error signal if they differ.

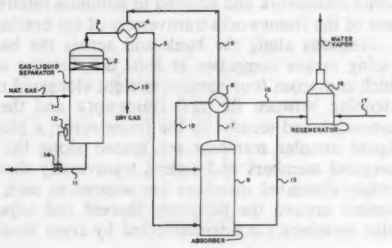
A second portion of the insert track takes each group of main and associated documents past insertion stations which selectively insert additional material with each group in accordance with the control signals generated in response to the control indicia on the main documents. The insertion track then moves the thusly formed groups past both a device for selectively stuffing each group into envelopes and a sealing station where the envelopes are selectively sealed. Next, the second portion of the insert track moves the stuffed envelopes past an error stacking station, a hold stacking station, and an overweight stacking station. The error stacker is operative in response to an error signal from the comparator to remove stuffed envelopes from the insert track. The hold stacker is operative to remove selected envelopes from the insert track in response to control signals derived from that envelope's main document. The overweight stacker is operative to remove selected envelopes from the insert track when they weigh more than a predetermined amount. Those documents which successfully pass the stacking stations are delivered to a postage meter.

3,606,729

PREHEATING GAS FEED TO GLYCOL ABSORBER

Ivan A. Peterson, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Apr. 11, 1969, Ser. No. 815,347
Int. Cl. B01d *53/14*
U.S. Cl. 55—32 **6 Claims**



A method of cooling a hot regenerated moisture absorbent and of preheating a feedstream gas containing moisture ahead of the dehydrator without the need for external cooling and heating sources. The method maintains the absorbent effectively free of foam causing condensable components carried by the feedstream gas.

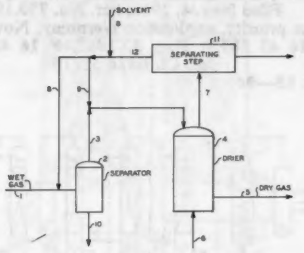
3,606,730

REMOVAL OF DEPOSITS FROM SOLID DESICCANT-CONTAINING DEHYDRATORS

William C. Clark and Tommy R. Miller, Sweeny, Tex., assignors to Phillips Petroleum Company

Filed Oct. 29, 1969, Ser. No. 872,197
Int. Cl. B01d *53/02*
U.S. Cl. 55—33 **7 Claims**

Deposits which occur in desiccant beds used to dehydrate gases containing depositable material or polymerizable constituents are removed by adding with the gases passing to the desiccant bed a solvent for the depositable material so as to adsorb in the desiccant at least a portion of the solvent which upon regeneration of the desiccant bed leaves the bed together with the depositable material as when the bed is regenerated with hot regenerated gases. In one embodiment an unsaturated hydrocarbon-containing gas, e.g., an ethylene-containing gas, resulting from the pyrolytic conversion of a saturated hydrocarbon such as ethane or propane, is passed, at least for a portion of the time it is being dehydrated, together with an aromatic solvent, for example, benzene or toluene, into the desiccant



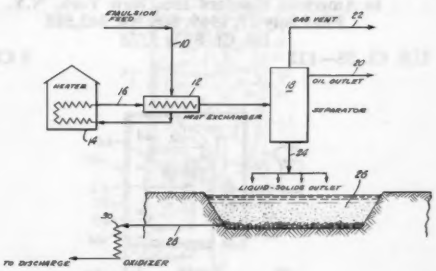
bed. The flow of solvent need not be continuous. In another embodiment solvent is placed upon the desiccant bed before the gases are passed thereto so that solvent will be present as the depositable material coats onto the desiccant. In the case of polymerizable material which will polymerize and harden during the heated regeneration cycle, the solvent aids in the removal of the depositable material and the solvent can be recovered therefrom for reuse. In a modification at least a portion of the solvent is intermingled with the gas feed and the mixture passed to a separation zone for separation of liquid. This further prolongs the useful life and efficiency of the desiccant.

3,606,731

WATER TREATING PROCESS

Edward Cole, Fishkill, and Howard V. Hess, Glenham, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 20, 1969, Ser. No. 878,483
Int. Cl. B01d *19/00, 37/00;* **C02b** *1/02, 1/34*
U.S. Cl. 55—45 **5 Claims**



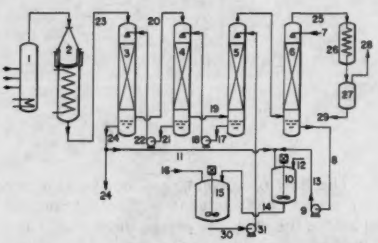
A water treatment process for breaking emulsions such as algae-oil-water emulsions into gas, oil, water and coke includes the steps of coking the emulsions under autogenous pressure at 450 to 700° F. for 0.5 minute to 120 minutes, cooling to form a separable, four phase system comprising gases, oil, water and coke; venting off the gases; removing the oil to thereby obtain a water-coke slurry, filtering off the coke and collecting an aqueous phase. The aqueous phase can be reduced in COD by

treating with air at elevated temperature prior to final disposal. The oil is suitable for recycling to a crude still. The process can be carried out either batchwise or on a continuous basis and is particularly useful for breaking algae-oil-water emulsions occurring in API separators.

3,606,732
ABSORPTION OF FORMALDEHYDE FROM GASES CONTAINING IT

Alfred Woerner, Limburgerhof, Gerd Duembgen, Dannstadt, Heinrich Sperber and Hans Haas, Ludwigshafen, and Otto Grabowsky, Limburgerhof, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Nov. 4, 1968, Ser. No. 773,190
Claims priority, application Germany, Nov. 4, 1967, P 16 43 689.8; Dec. 2, 1967, P 16 43 705.1
Int. Cl. B01d *53/16*
U.S. Cl. 55—94 3 Claims

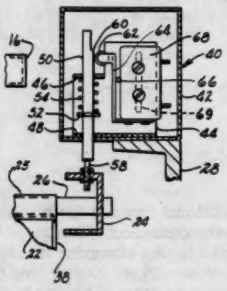


A process for the absorption of formaldehyde from gas containing formaldehyde (obtained in the dehydrogenating oxidation of methanol over silver catalysts) at elevated temperature in a plurality of stages, wherein the gas passes through at least three absorption stages at temperatures of from 60° to about 90° C., particularly from 70° to 85° C., and is contacted in each of the stages from the first stage to the penultimate stage with an aqueous solution of a urea-formaldehyde precondensate and in the final stage is contacted with an aqueous solution of urea.

3,606,733
CLEANING CONTROL FOR ELECTROSTATIC PRECIPITATOR

Arunas A. Arstikaitis, Dearborn Heights, Mich., assignor to American Standard Inc., New York, N.Y.

Filed July 17, 1969, Ser. No. 842,588
Int. Cl. B03c *3/76*
U.S. Cl. 55—112 5 Claims

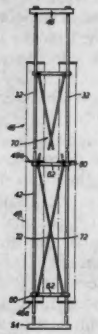


An industrial electrostatic precipitator having a rapper control which initiates a rapper cycle in response to dust weight accumulations on the collector plates. The plates are deflected downwardly by the weight of the dust; after predetermined weight increase the deflection is sufficient to actuate a trigger for the rapper control.

3,606,734
ELECTRO-PRECIPITATION

John F. Dyla, Birmingham, England, assignor to Lodge-Cottrell Limited, Birmingham, England

Filed Apr. 17, 1969, Ser. No. 817,103
Claims priority, application Great Britain, May 4, 1968, 21,238/68
Int. Cl. B03c *3/04*
U.S. Cl. 55—148 11 Claims



An electro-precipitator discharge electrode support structure comprises a first framework adapted to support upper end portions of discharge electrodes of an electro-precipitator electrode bank, a second framework adapted to support lower end portions of the discharge electrodes, and bracing means securing the first framework to the second framework and adapted to minimise relative movement of the frameworks transversely of the bracing means in directions along the bank and across the bank. The bracing means comprises at least one bracing assembly which comprises four parallel straight elongated members extending between the first framework and the second framework and secured to the frameworks; a plurality of aligned annular members are spaced along the straight elongated members and extend transversely thereto; the straight elongated members are secured to each annular member around the periphery thereof and adjacent annular members are interconnected by cross bracing.

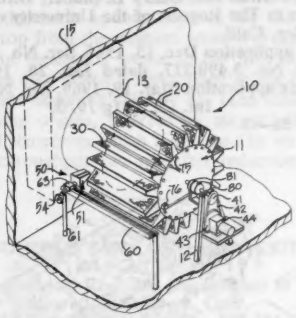
3,606,735
AIR FILTER ASSEMBLY PROVIDING INCREASED FILTERING SURFACE AREA FOR A GIVEN VOLUMETRIC SIZE

Joseph F. Baigas, Jr., Charlotte, N.C., assignor to Aeronca, Inc., Middletown, Ohio

Filed July 1, 1969, Ser. No. 838,146
Int. Cl. B01d *46/26*
U.S. Cl. 55—273 25 Claims

An air filter assembly specifically characterized by providing increased filtering surface area for a given volumetric size comprising a support cage having a generally cylindrical hollow base portion and a plurality of radially extending, hollow, perforate protuberance portions projecting outwardly from the base portion and extending longitudinally thereof, the number of protuberance portions being related to the diameter of the cylindrical base

portion and being approximately between 3–6 protuberances per foot of diameter of the base portion, and flexible filter media disposed around and secure to the outside surface of the protuberance portions for filtering a stream of air passing therethrough. Preferably, the air filter assembly includes means for mounting the air filter for rotation in the stream of air, means for rotating the air filter in the stream of air, and improved means positioned in operative relationship with the air filter for cleaning the filter media.

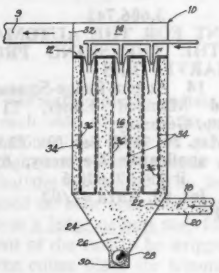


3,606,736

APPARATUS FOR FILTERING SUSPENDED SOLIDS FROM GASEOUS MEDIUM AND FOR REMOVAL OF FILTER CAKE FROM FILTER ELEMENTS

Raymond M. Leliaert, South Bend, and Clyde A. Snyder, Mishawaka, Ind., assignors to The Wheelabrator Corporation, Mishawaka, Ind.

Filed June 16, 1969, Ser. No. 833,531
Int. Cl. B01d *46/04*
U.S. Cl. 55—302 8 Claims



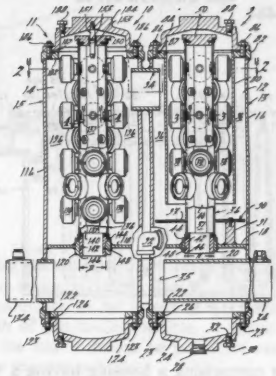
Apparatus for gaseous filtration to effect removal of suspended solids in which use is made of elongate filter elements having an open end and means for flowing gaseous medium containing the suspended solids through the walls of the filter element whereby separated solids collect on the outer wall of the filter element as a filter cake and in which use is made of a gas nozzle in endwise alignment and colinear alignment with one or more auxiliary nozzles followed by a venturi for releasing or generating a burst of gas of high pressure and increasing volume in the interior of the filter tube being cleaned, to effect removal of solids collected on the walls of the tube, without stopping total filter flow.

3,606,737

GAS DISPERSOID SEPARATOR

Harvard S. Lefevre, Ann Arbor, Mich., assignor to King Engineering Corporation, Ann Arbor, Mich.

Filed May 9, 1968, Ser. No. 727,969
Int. Cl. B01d *50/00*
U.S. Cl. 55—319 23 Claims



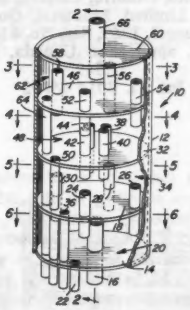
A gas dispersoid separator utilizing separate interconnected coalescing and filtering chambers and including disposable assemblies each having a plurality of dispersoid removal elements.

3,606,738

FLUID SEPARATOR

Ben Kraus, Jr., 3101 Washington Pike, Bridgeville, Pa. 15017

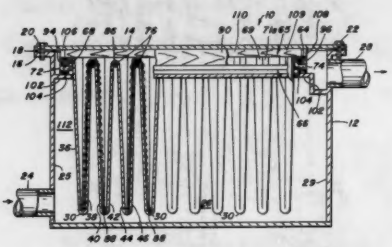
Filed Dec. 2, 1969, Ser. No. 881,447
Int. Cl. B01d *45/08*
U.S. Cl. 55—446 2 Claims



A number of axially spaced baffle plates are enclosed within a cylindrical housing having inlets at one end and an outlet at the other end. The spaced baffle plates define a plurality of adjacent chambers through which inlet fluid sequentially passes. Ports in each baffle plate are in offset relation to the ports in an adjacent baffle plate so that the fluid flowing into any given chamber is caused to impinge upon the baffle plate in that chamber thereby resulting in the separation of a heavier constituent from the composite fluid flowing through the chamber. As an end result of

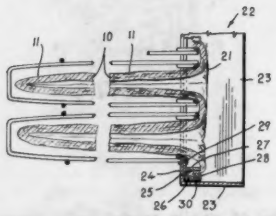
sequential impinging action against the spaced baffle plates, a relatively liquid free gas is emitted from the outlet end of the fluid separator.

3,606,739
AIR FILTER
Donald A. Peterson, 5616 Koeffler Drive, Pittsburgh, Pa. 15236
Filed July 10, 1969, Ser. No. 840,733
Int. Cl. B01d 46/02
U.S. Cl. 55—484 8 Claims



An air filter comprising a housing having a removable lid and an inlet opening and an outlet opening. A unitary filtering medium comprising a single length of material formed into a plurality of individual bags is supported within the housing of the filter between the inlet opening and the outlet opening. The unitary filtering medium is secured to and supported by an integral frame member which is, in turn, supported by portions of the housing and maintained in position within the housing by the co-operative arrangement of the lid of the housing and members disposed between the lid and peripheral portions of the frame member.

3,606,740
HIGH EFFICIENCY AIR FILTER
Peter Donald Ballennie, deceased, late of Toronto, Ontario, Canada, by Eileen Margaret Ballennie, executrix, Toronto, Ontario, Canada, assignor to Johnson & Johnson Limited, Montreal, Quebec, Canada
Filed June 5, 1969, Ser. No. 830,885
Claims priority, application Canada, Oct. 3, 1969, 31,541
Int. Cl. B01d 46/02
U.S. Cl. 55—500 1 Claim

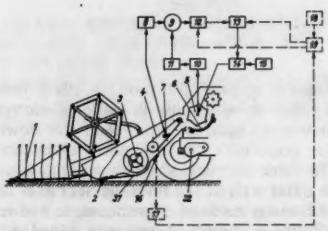


An air filter for an air filtering system in which the air filter medium of micro-fibres is covered on both sides with a continuous porous non-woven cover, the medium and cover being folded over upon itself to form a plurality of side-by-side socks which open outwardly in the same direction to form the air inlet, the longitudinal marginal edges of the medium and cover forming each sock being sewn together and placed adjacent the air inlet to form a continuous rectangular air frame allowance around said air inlet.

3,606,741
METHOD FOR HARVESTING GRAPES
Harold P. Olmo and Henry E. Studer, Davis, Calif., assignors to The Regents of the University of California, Berkeley, Calif.
Original application Dec. 15, 1965, Ser. No. 514,049, now Patent No. 3,490,217, dated Jan. 20, 1970. Divided and this application Mar. 19, 1969, Ser. No. 822,780
Int. Cl. A01g 19/00
U.S. Cl. 56—1 5 Claims

A method of harvesting grapes includes training a last season shoot from the vine trunk to extend along a horizontal trellis wire to serve as a present season fruiting cane. The fruiting cane may be severed from the trunk prior to harvesting. The wire and fruiting cane are struck with a jerk in a substantially vertical direction to dislodge the grapes as berries and as bunches.

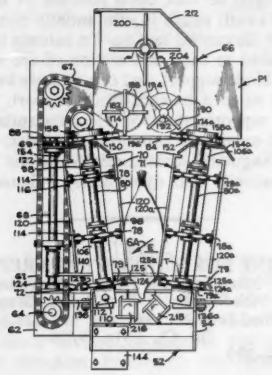
3,606,742
ARRANGEMENT FOR THE AUTOMATIC CONTROL OF THE THRESHING PROCESS ON COMBINE HARVESTERS
Franz Wieneke, 14 August-Lange-Strasse, Bovenden, Germany, and Manfred Elmer, 11 Finkenweg, Gottingen-Grone, Germany
Filed Mar. 26, 1970, Ser. No. 22,954
Claims priority, application Germany, Apr. 5, 1969, P 19 17 670.6
Int. Cl. A01d 41/02
U.S. Cl. 56—10.2 31 Claims



An arrangement for the automatic control of the threshing process on combine harvesters of which the well known

working tools include a control circuit for the automatic regulation of the threshing-cylinder speed, in which a reduction delayer is incorporated which is so constructed that an output value from a throughput measuring sensor connected in this first control circuit or a value derived from said output value which is released by a decrease in the crop throughput is only allowed to pass this reduction delayer after the expiry of a period of time which is substantially the same as that required for the conveyance of the crop from the moment when it is detected by the throughput measuring sensor to the time when that quantity of the crop which is determined by the last existing speed of the threshing cylinder has been threshed out in the threshing organs, whereas an output value or a value derived therefrom which is released by an increase in the crop throughput can pass this reduction delayer unhindered.

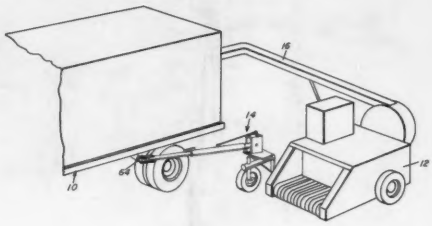
3,606,743
PICKING HEAD FOR CORN HARVESTING MACHINE
Robert A. Johnson, Rossville, Ill., assignor to FMC Corporation, San Jose, Calif.
Filed Dec. 11, 1969, Ser. No. 884,101
Int. Cl. A01d *45/02*
U.S. Cl. 56—14.2 **13 Claims**



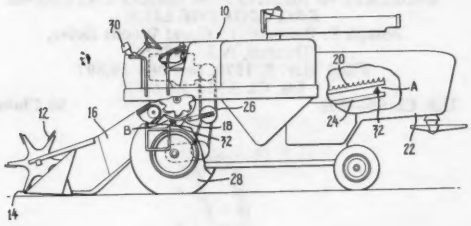
A pair of vertically spaced endless driven belts are provided at each side of the picking head of a corn harvesting machine. The upper or gathering belts have confronting flights of closely spaced slats which form walls straddling the cornstalks. The lower or butt stop belts are formed of bent slats that slope inward to cooperatively form a ledge or butt stop for arresting downward movement of the ears to be stripped from the stalk. A power driven cutter blade for trimming the butt ends of the ears is mounted between the upper and lower pairs of gathering and butt stop belts in the path of the lower ends of the upright ears. Downstream of the butt trimming blade, each ear strikes a fixed abutment which orients the trimmed ear to be discharged from the machine tassle-end first.

3,606,744
ADJUSTABLE TOWING HITCH
Terry W. Eubanks, Ashland, Kans., assignor of fractional part interest to Robert M. Baker, Ashland, Kans.
Filed Aug. 29, 1969, Ser. No. 854,237
Int. Cl. B60d *1/16*; A01d *43/06*
U.S. Cl. 56—14.4 **3 Claims**

Subject invention relates to an adjustable towing hitch for use with a field or ensilage cutter. The hitch is secured to the frame of the field cutter by a connection bracket. A telescoping draw bar secured to the connection bracket extends forward to engage a bracket mounted on the side of a tow vehicle, a suitable locking mechanism being provided to prevent the draw bar from telescoping outwardly when the cutter is being towed. The connection bracket permits the draw bar to be pivoted in a vertical plane while giving it lateral stability, thereby permitting the cutter to be towed at a position to the side of the path of the towing vehicle. A swivel wheel is provided on the cutter frame to steer the cutter so that it will follow the tow vehicle.



3,606,745
GRAIN FLOW RATE MONITOR
Joseph C. F. Girodat, Brampton, Ontario, Canada, assignor to Massey-Ferguson Industries Limited, Toronto, Ontario, Canada
Filed Sept. 8, 1969, Ser. No. 855,909
Int. Cl. A01d *41/02*
U.S. Cl. 56—20 **7 Claims**



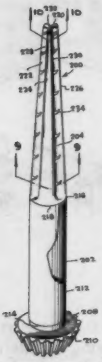
A combine harvester is provided with a circuit for detecting the flow rate of grain at any particular point in the combine. This circuit includes a high frequency piezoelectric transducer located at a convenient point in the path of flow of the grain. As grain and other crop materials impinge, the transducer develops voltage spikes, a particular frequency range of which is detected by a frequency detecting circuit which amplifies the detected spikes. Next the signal is fed to an amplitude detecting circuit to detect a range of amplitudes of voltage spikes above a predetermined amplitude which includes spikes produced by grain impingement on the transducer, but excludes the spikes produced by other threshed crop material. The detected voltage spikes are then converted by a monostable multivibrator into square wave form and sent to a meter circuit where they are average and visually displayed on a meter. In this manner the combine operator can instantaneously know the flow rate of grain at any specified point in the combine and can determine from this flow whether the combine is operating efficiently.

3,606,746

COTTON PICKING SPINDLES

Norman G. Hayward, Rte. 2, Box 119G, Manassas, Va. 22110

Filed Dec. 16, 1969, Ser. No. 885,506
Int. Cl. A01d 45/18
U.S. Cl. 56—50 5 Claims



A spindle for cotton picking apparatus has at least its materials contact portion formed of hard plastic, the plastic portion having rows of hook-like teeth to engage the plant fibers.

A spindle for cotton picking machinery, the spindle comprising a metallic base with an outward portion, and a plastic sleeve for said outward portion, the sleeve having means for releasable engagement with the portion and having teeth therein.

3,606,747

INDICATING MEANS FOR GRASS CATCHING BAG AND THE LIKE

Joseph F. Bauman, 17 Great Woods Drive, Trenton, N.J. 08618

Filed Mar. 5, 1970, Ser. No. 16,897
Int. Cl. A01d 53/06
U.S. Cl. 56—202 10 Claims

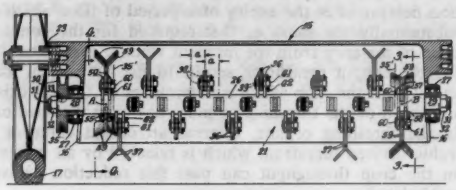
A grass catching bag in which one or a plurality of slits or openings are provided near the inlet end of the bag so as to enable observation of grass clippings therethrough to permit the operator of the power mower to easily and readily determine the fact that the grass catching bag is nearly filled with grass clippings. The openings may be reinforced, may be provided with transparent windows of either a flexible or inflexible type, or may be provided with a movable "flag" or indicator which projects through the opening to indicate the fact that the bag is filled or nearly filled with grass clippings, or the like.

3,606,748

BALANCED CUTTING ASSEMBLY FOR A MOWER

Tommy A. Middlesworth, Hinsdale, Ill., assignor to Mott Corporation, La Grange, Ill.

Filed Sept. 8, 1969, Ser. No. 855,938
Int. Cl. A01d 55/22
U.S. Cl. 56—294 14 Claims



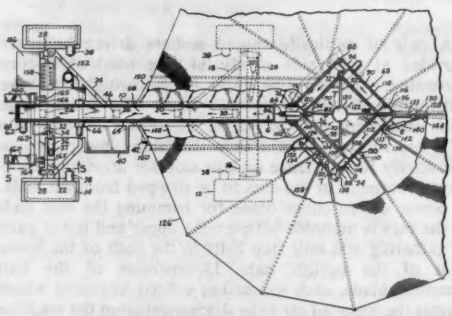
This disclosure deals with a statically and dynamically balanced cutting assembly for use in a mower. The assembly includes a rotatable shaft, a plurality of radially extending cutting blade supports secured to said shaft, and one or more cutting blades attached to each of said supports. The supports are angularly and circumferentially spaced in a predetermined pattern along a central section of the shaft so that, upon rotation of the shaft, the blades cut a swath which is substantially continuous over the length of the central section. To balance the assembly, there is secured to each end section of the shaft at least one balance blade support, and one or more balance blades are fastened to each balance blade support. The balance blades and supports therefor are substantially identical with the first mentioned supports and blades, and they are axially and angularly located relative to the pattern such that they statically and dynamically balance the assembly.

3,606,749

MACHINE FOR HARVESTING TREE CROPS

Frank W. Morrison and Jerry E. Morrison, both of 2408 E. 14th St., Rte. 1, The Dalles, Oreg. 97338

Filed June 23, 1969, Ser. No. 835,605
Int. Cl. A01g 19/06
U.S. Cl. 56—329 10 Claims



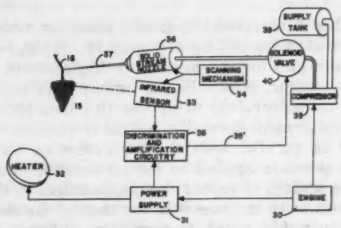
The machine of the invention has a wheeled frame supporting an elongated longitudinally and laterally tiltable conveyor. The forward end of the conveyor carries a collecting unit having a head comprising a pair of flared arms each pivotally supporting an extension capable of opening movement to receive a tree in the opening and capable of closing for encompassing the trunk of

the tree. The arms and extensions have conveyors therein which deposit fallen crop in the longitudinal conveyor. The head has pivotal outriggers thereon supporting a flexible collecting apron, and fluid operated cylinders are provided for moving the arm extensions and the apron between open and closed positions. Power driven adjustment means are provided at a pivot connection between the longitudinal conveyor and the head for varying the longitudinal angular tilt of the latter. Power driven adjustment means are also provided for varying the lateral tilt of the conveyor. The machine has blower means for separating dust and leaves from the harvested crop. Tiltable lifting forks are provided at the rearward end of the machine for supporting tote boxes or the like.

3,606,750
FRUIT HARVESTER

Larry B. Walker, 1322 Frances Ave., Fullerton, Calif. 92631, and Howard Lauck, 2240 James Downey Road, Independence, Mo. 64050

Filed Apr. 11, 1969, Ser. No. 815,380
Int. Cl. A01g *19/00*
U.S. Cl. 56—331 **26 Claims**



A harvester for vine or tree borne fruit. An infrared sensor scans the plant and locates the fruit by sensing the different thermal emissivity of the fruit compared with adjacent stem or leaves. A cutter, actuated by the sensor, selectively severs the stem in response to such thermal fruit detection. Preferably, the cutter comprises a fine, high intensity stream of air or water.

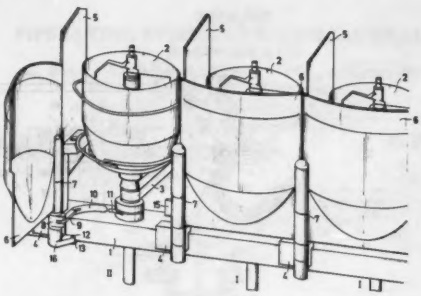
In a typical application as a grape harvester, a tractor mounted heater preheats the vines being picked. A thermal sensor and the cutter nozzle, situated on the tractor rearward of the heater, simultaneously are scanned across the preheated vine. When a cluster of grapes is located, as indicated by maximal thermal emissivity, high pressure water from a compressor is supplied to the nozzle via a solenoid valve actuated by the sensor. The resultant cutting stream selectively severs the grape cluster.

3,606,751
CASING FOR TWISTING SPINDLES

Heinrich Peter Weller, 63 Beethovenstrasse, 405 Monchen-Gladbach, Germany, and Josef Mehl, 18 Schillerstrasse, 5144 Wegberg, Germany

Filed Apr. 28, 1969, Ser. No. 819,711
Claims priority, application Germany, Apr. 26, 1968, P 17 60 270.9
Int. Cl. D01h *1/24, 1/42, 7/18*
U.S. Cl. 57—88 **4 Claims**

Vertical side plates are arranged between adjacent pairs of twisting spindles to separate them, and extending across the front of each spindle between side plates is a door that is cylindrically curved, and also conically tapered at the bottom, to follow the contour of the thread balloon. The door is hinged at one edge for horizontal swinging movement, and an arm on the pivot shaft is connected to one end of a bowed spring that passes over-center to exert a force tending to hold the door either open or closed. Another arm on the pivot shaft is connected by

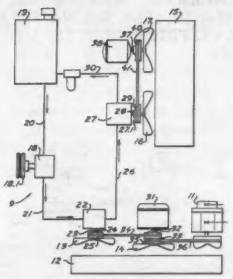


linkage to a brake-actuating arm that brakes the spindle when the door is opened.

3,606,752
DRIVE FOR VEHICLE MOUNTED REFRIGERATION SYSTEMS

Lawrence Shaw, Vancouver, British Columbia, Canada, assignor to Fraser Valley Milk Producers Association, Burnaby, British Columbia, Canada

Filed Dec. 15, 1969, Ser. No. 885,019
Int. Cl. F01b *21/00;* **F25b** *27/00, 41/00*
U.S. Cl. 60—6 **2 Claims**



A drive arrangement for a vehicle mounted refrigeration system having electrically powered motors connectable to a source of electric power remote from the vehicle, and hydraulically powered motors operated from a vehicle mounted source of power, each arranged for independent operation of the refrigeration system, the hydraulic motors being connected to the electric motors through cam clutches arranged to permit overrunning of the hydraulic motors by the electric motors.

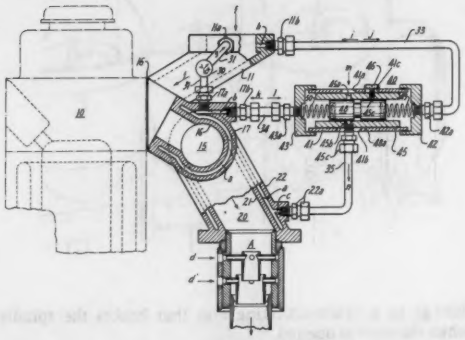
3,606,753
AIR POLLUTION SYSTEM TEMPERATURE CONTROL

Robert C. La Force, West View Drive, R.D. 1, Beaver, Pa. 15009

Filed Sept. 8, 1969, Ser. No. 856,027
Int. Cl. F01n *3/10;* **F28f** *13/00*
U.S. Cl. 60—30 **10 Claims**

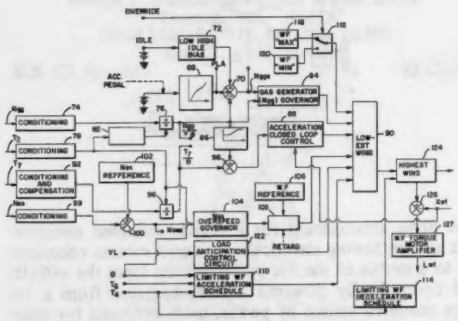
A method and apparatus are provided for maintaining the temperature of hot gases being exhausted from an internal combustion engine within a controlled range for assuring a maximized thermal reacting of hydrocarbons

and carbon monoxide with a minimized production of nitrogen oxides before discharge into the atmosphere. The mtehod and apparatus employ fluid-jacketing of an exhaust manifold and a valve system operatively-connected between the jacketing and an intake manifold to



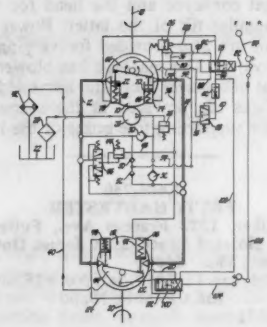
supply air to the jacketing to reduce the temperature of the exhaust gases when the engine is operating under full or heavy load and to withdraw air and provide a maximized insulating effect when the engine is operating under a low load or is idling.

3,606,754
HYBRID FUEL CONTROL
Albert H. White, Wethersfield, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.
Filed May 19, 1969, Ser. No. 825,857
Int. Cl. F02c *9/08, 7/28, 3/10*
U.S. Cl. 60—39.28 **14 Claims**



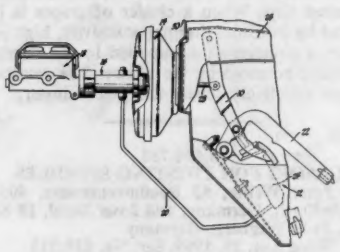
An electronic-hydromechanical control for a regenerative gas turbine engine wherein a fuel metering valve and power turbine inlet nozzles are positioned in response to control signals provided by a closed loop system wherein gas generator turbine inlet temperature is the principal control parameter. Engine operating parameters, including gas generator turbine inlet temperature, are sensed and electrical signals commensurate therewith are delivered as inputs to logic circuitry where, in combination with selected operational mode inputs provided by the operator, they are operated upon to provide control signals for the power turbine nozzle actuators and the gas generator fuel control metering valve.

3,606,755
POWER TRANSMISSION
Donald C. Connett, Huntington Beach, Calif., assignor to Sperry Rand Corporation, Troy, Mich.
Filed Mar. 16, 1970, Ser. No. 19,575
Int. Cl. F16h *39/46*
U.S. Cl. 60—53A **7 Claims**



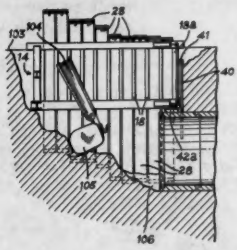
A variable displacement hydraulic pump or motor unit is biased toward neutral by centering springs in the case of the pump and toward maximum displacement in the case of the motor. Hydraulic servomotors are controlled by follow-up servovalves to oppose this bias for adjusting the displacement normally. A load responsive valve is connected in parallel with the servovalve or valves to dump the pressure applied to the servomotor and allow the biasing springs to reduce the displacement in the case of the pump or to increase it in the case of the motor. A hydraulic variable speed transmission utilizing such a pump and such a motor with a single load limiting valve is arranged to give priority to load limiting action at the motor before such action occurs at the pump.

3,606,756
BRAKE CONTROLS FOR DRIVER TRAINING CARS
Robert H. Hellmann, Grand Blanc, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Apr. 24, 1970, Ser. No. 31,692
Int. Cl. F15b *7/00*
U.S. Cl. 60—54.5 **3 Claims**



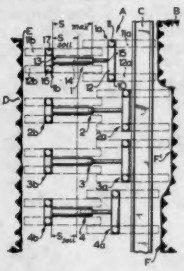
An auxiliary brake control for a driver training car which includes a slave cylinder unit installed between the usual master cylinder and the brake booster, or the master cylinder and the service pedal push rod in a manual brake system. An auxiliary brake pedal and hydraulic cylinder actuable by a passenger provides fluid pressure to the slave unit for brake actuation independently of the usual brake pedal.

3,606,757
METHOD FOR LAYING PIPE
Lloyd De Weese and Marilyn Langston De Weese, both of 6280 Garber Road, Dayton, Ohio 45415
Original application June 21, 1967, Ser. No. 647,692, now Patent No. 3,496,727, dated Feb. 24, 1970. Divided and this application Aug. 8, 1969, Ser. No. 848,618
Int. Cl. E02d 5/02, 5/06
U.S. Cl. 61—41 5 Claims



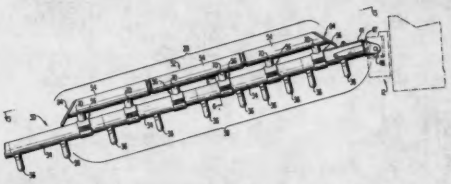
Method for laying large diameter concrete pipe in an excavation of minimum width with maximum safety provided for the personnel laying the pipe includes the steps of digging a partial trench, inserting an excavating cage therein, completing the ditch and lowering sliding individual cantilevered shear members to reinforce the side walls of the trench, laying the pipe and digging an adjacent partial trench, raising the shear members and advancing the cage into the adjacent partial trench and then repeating the cycle. The excavating cage is a rigid frame having a large unobstructed center to permit completion of the excavation therein with a back hoe. The vertically slidable shear members are rigidly supported in guide slots and are capable of withstanding the substantial pressures in their extended position without being cross braced, and a rear shield is provided to permit back filling of the excavation.

3,606,758
HYDRAULIC PIT PROP ARRANGEMENTS
Wilhelm Gotze, Essen, Germany, assignor to Bergwerksverband GmbH, Essen, Germany
Filed Feb. 12, 1969, Ser. No. 798,608
Claims priority, application Germany, Feb. 28, 1968, P 15 83 794.2
Int. Cl. E21d 15/44
U.S. Cl. 61—45 4 Claims



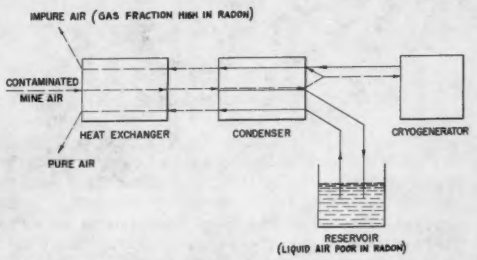
A hydraulic pit prop arrangement, the pit props of which make up units at the working face and at a stowing face, these units being automatically advanced by means of at least one thrust ram mechanism, wherein the pit prop units are combined into structures having units operative at the working face and at the stowing side, and these structures are associated in groups under the control of two control circuits, a main control circuit whereby the working face units within a group are automatically advanced in accordance with the changing contours of the working face and a subordinate control circuit whereby the stowing side units are successively advanced by the same predetermined distance.

3,606,759
PIPELAYING SYSTEM UTILIZING AUXILIARY RAMP MEANS
Joe C. Lochridge, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.
Filed July 16, 1970, Ser. No. 55,528
Int. Cl. B63b 35/04; F16l 1/00
U.S. Cl. 61—72.3 17 Claims



A method and apparatus for use in a pipelaying operation utilizing primary ramp means adapted to be pivotally attached to a floating vessel and including primary support means to buoyantly and slidably support a leading portion of pipeline depending from the floating vessel into a body of water. Auxiliary ramp means, including auxiliary support means for slidably supporting a trailing portion of the pipeline, is carried by the primary ramp means adjacent the end pivotally attached to the vessel. The primary and auxiliary support means are offset, with the auxiliary support means defining at the portion adjacent the primary support means an inflection point for the pipeline slidably moving from one support means to the other. Attachment of the auxiliary ramp means to the primary ramp means is accomplished through resilient mounting so as to permit relative lateral and vertical movement between the two and so as to isolate the load on the primary ramp means from the auxiliary ramp means. The auxiliary ramp means may include longitudinally separated, tubular sections independently carried by tubular sections of the primary ramp means and flange means may be provided to bridge space between each auxiliary section end and between those ends and the primary ramp means.

3,606,760
METHOD FOR PURIFICATION OF RADON-CONTAINING AIR
William P. Howell, 5941 Crestmont Ave., Livermore, Calif. 94550
Filed Feb. 29, 1968, Ser. No. 709,278
Int. Cl. F25j 1/02, 3/08, 3/04
U.S. Cl. 62—11 11 Claims



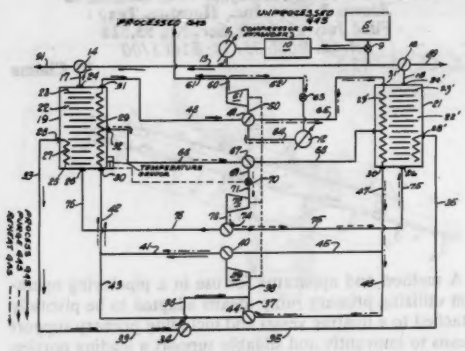
Radon-containing mine air is purified by partially condensing impure air, discarding the uncondensed fraction as waste, and vaporizing the liquid fraction to form a purified air fraction.

3,606,761

METHOD AND APPARATUS FOR CRYOGENIC GAS SEPARATION

James R. Muenger, Beacon, and David L. Alexander, Fishkill, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed June 28, 1968, Ser. No. 740,963
Int. Cl. F25j 1/00, 3/00, 3/08
U.S. Cl. 62—12 13 Claims



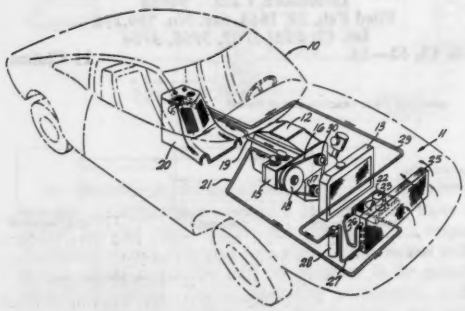
The invention relates to a method and apparatus for the continuous removal of higher boiling point constituents from a process gas stream containing such constituents. It relates particularly to a process for the purification or enrichment of a gas by cryogenic condensation of the higher boiling point constituents from the gas stream, which condensate is transferred to a minor stream of the purified gas at substantially atmospheric pressure in a purging step. The refrigeration necessary to drive the cryogenic system is furnished by a moderate expansion of the purified gas and a further expansion of the purge gas. The refrigeration potential, represented by the latent heat of the condensate, is conserved by a recycle stream of the purified gas.

3,606,762

METHOD AND APPARATUS FOR AIR CONDITIONING AUTOMOBILES AND THE LIKE

Paul E. Anglin and William E. Anglin, Dallas, Tex., assignors to William E. Anglin, Paul E. Anglin, and Trammell Crow Investment Company, all of Dallas, Tex., fractional part interest to each

Filed Oct. 24, 1969, Ser. No. 869,114
Int. Cl. B60h 3/04
U.S. Cl. 62—61 7 Claims



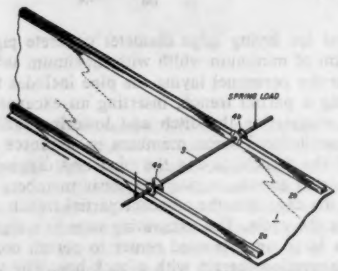
This automobile air conditioning system utilizes a refrigerant condenser system, preferably of the relatively flat interconnected compartment type, or if desired the conventional tubular type, mounted in front of the automobile radiator, preferably spaced a considerable distance forward of same, with an additional section for receiving the superheated refrigerant gas direct from the compressor. Independent means are provided for forcing cooling air through this additional section and generally out below the automobile radiator so as to not disturb the normal engine cooling operation of the latter. The thus precooled refrigerant then passes through said refrigerant condenser preferably well forward of and in front of the automobile radiator, with the refrigerant gas condensation being substantially completed in this condenser ready for delivery to and through the conventional refrigerant expansion valve and evaporation chamber of the air conditioning system.

3,606,763

METHOD OF FREEZING LIQUID ON A BELT AND APPARATUS FOR ACCOMPLISHING SAME

Lyndon Gene Bevins, Houston, Tex., assignor to General Foods Corporation, White Plains, N.Y.

Filed May 28, 1969, Ser. No. 828,622
Int. Cl. F25c 1/12
U.S. Cl. 62—72 8 Claims



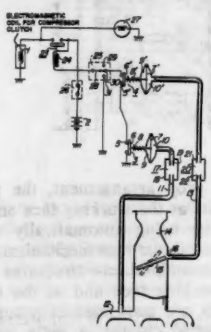
It has been discovered that the efficiency of a process wherein extract is frozen on a continuous belt can be greatly increased by mechanically separating the extract from the side skirts used to contain the extract. The separation is performed when the extract is in a semi-solid state. The process of this invention minimizes product loss and prevents costly shutdowns due to torn side skirts. A scraper wheel has been designed which effectively accomplishes the mechanical separation.

3,606,764

AUTOMATIC CLUTCH CONTROLLING SYSTEM FOR REFRIGERATING APPARATUS INSTALLED IN AUTOMOBILE

Naotadashi Yokouchi and Tosikatu Ito, Hitachi-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

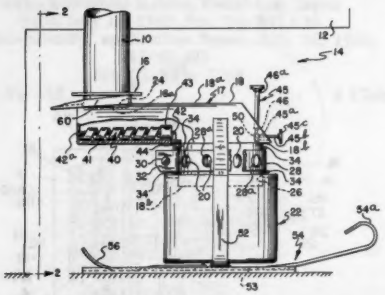
Filed Apr. 17, 1969, Ser. No. 817,113
Claims priority, application Japan, Apr. 24, 1968, 43/33,013; May 22, 1968, 43/34,628; Aug. 26, 1968, 43/72,805
Int. Cl. F25b 27/00
U.S. Cl. 62—213 5 Claims



An automatic clutch controlling system for refrigerating apparatus installed in an automobile, including a

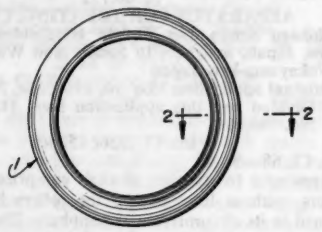
first switch means adapted to be opened and closed in accordance with an eased change in a depression occurring in an intake manifold, and a second switch means adapted to be opened and closed in accordance with a change in a depression occurring in the neighborhood of a throttle valve of carbureter, said first and second switch means being inserted in an energization circuit associated with the coil of an electromagnetic clutch for connecting the compressor of the refrigerating apparatus installed in the vehicle with the engine to thereby disengage said electromagnetic valve for the purpose of stopping the driving of the refrigerating apparatus during the idling, quick-accelerating and high-power running operations.

3,606,765
CANNED FUEL ADAPTER FOR ABSORPTION-TYPE REFRIGERATION UNIT
Carl F. Schmidt, 3999 Green St., Perry, Ohio 44081
Filed June 23, 1969, Ser. No. 835,448
Int. Cl. F25b *15/00*; F24b *5/00*
U.S. Cl. 62—476 **9 Claims**



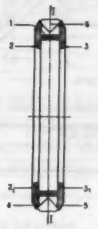
A canned fuel adapter mechanism for mounting a container of canned liquid fuel thereto and providing for positioning of such canned fuel into heat transferring coaction with the generator of an absorption-type refrigeration unit, for operating the latter. The adapter comprises a combustion section and a duct section for transmittting the heat from a container of the burning fuel to the generator of the refrigeration unit, and includes means for quickly positioning the container of fuel in coacting relationship with the generator heat inlet pipe usually found underneath the refrigeration unit.

3,606,766
GOLD FINGER ARTICLE COMPOSED OF COMPRESSED AND SINTERED FINE GOLD POWDER AND A REFRACTORY OXIDE
James S. Hill, Cranford, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Newark, N.J.
Filed June 26, 1969, Ser. No. 836,735
Int. Cl. A44c *9/00*
U.S. Cl. 63—15 **5 Claims**



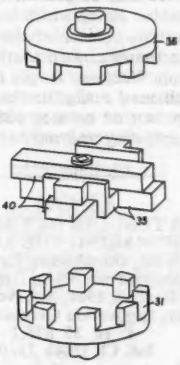
A gold finger ring composed of compressed and sintered fine gold powder having uniformly dispersed therethrough from 0.03% to 0.2% of refractory oxide particles having a size between 0.5 and 5 microns.

3,606,767
WEDDING RING WITH DEFORMABLE MEANS FOR REDUCING OR INCREASING SIZE
Jean Edouard Victor Auchere, 11 Rue du Val, Provins, Seine-et-Marne, France, and Bernard Claude Henri Auchere, 2 Rue du General Delestraint, Rosny-sous-Bois, Seine Saint Denis, France
Filed Dec. 22, 1969, Ser. No. 887,123
Int. Cl. A44c *9/02*
U.S. Cl. 63—15.5 **2 Claims**



Wedding-ring set with brilliants and having an annular deformable portion at its inner periphery which can be reduced or increased in inner diameter with the help of a machine for enlarging rings.

3,606,768
PARALLEL SHAFT COUPLING
Ernest Wildhaber, Brighton, N.Y.
(124 Summit Drive, Rochester, N.Y. 14620)
Filed Nov. 26, 1969, Ser. No. 880,097
Int. Cl. F16d *3/24*
U.S. Cl. 64—31 **10 Claims**

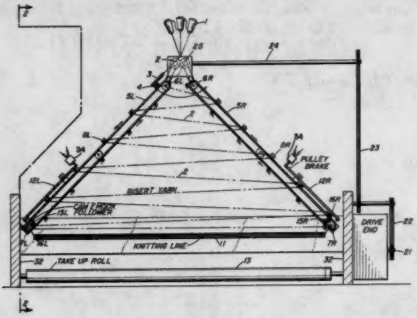


This coupling for parallel shafts comprises two coupling members rigid with said shafts and intermediate means for connecting them. Straight radial guideways are provided either on the coupling members or on the intermediate means. A single intermediate part working through said guideways causes dynamic unbalance. The invention provides two intermediate parts movable at right angles to each other on each coupling member, achieving mass-balance and increased load capacity. Friction is minimized with cylindrical rollers adapted to contact both sides of the guideways engaged thereby.

3,606,769
CONTINUOUS WEFT FEED FOR WARP KNITTING MACHINES

Richard L. Walford, Bloomfield, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.

Filed June 16, 1969, Ser. No. 833,402
Int. Cl. D04b 23/12
U.S. Cl. 66—84 14 Claims

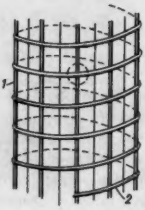


A continuous insert yarn feed for warp knitting machines is provided with two inclined chains leading to the ends of the knitting line, each chain carrying pulleys with tops or hats having a pointed extension. Insert yarn is fed from one or more packages to a reciprocating arm which carries the yarn around the pulleys on the outside of the chains in a zig-zag fashion. The yarn is around the pulley underneath the hat until it reaches a bottom sprocket in each chain, these sprockets being adjacent to the knitting line of the machine. As the pulleys on the chains turn around the bottom sprocket, the insert yarn is lifted onto the hat and on further turning slips off. The last motion around the right or left hand lower sprockets releases tension on the insert yarn as it is laid at the knitting line beside the warps. Knitting of the warps is by conventional means, including warp thread guides, needles, sinker bars, and the like. Brakes may be provided, for example a flat bar with a soft rubber lining which bears against the pulleys near the bottom of each chain. This prevents the pulleys from overrunning, particularly when a machine is slowing to a stop. With very fragile insert yarns or those which can stretch very easily, the brake can, if desired, be normally kept out of contact with the pulleys when the machine is operating and only engage them when it is slowing down.

3,606,770
SEAMLESS TUBULAR NET AND METHOD OF MAKING THE SAME

Karl Kohl, Offenbacher Landstr. 20, Hainstadt am Main, Germany

Filed Dec. 18, 1968, Ser. No. 784,835
Claims priority, application Germany, Dec. 20, 1967, P 16 35 875.1
Int. Cl. D04b 23/02
U.S. Cl. 66—87 2 Claims

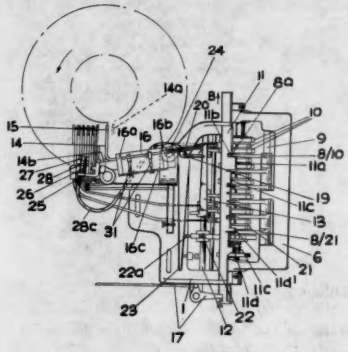


A seamless tubular net is made on a wrap knitting machine having two needle beds and three guide bars, the yarns of two bars knitting warp chains, and the third guide bar laying-in a yarn to connect the chains in two layers. The laid-in yarn is shifted stepwise in a walewise direction so that it forms a helix in the finished net. The circumferentially consecutive portions of the laid-in yarn connect chain stitches in the same course so that the several turns of the helix are bound to stitches in the same chain which are separated by stitches free from laid-in yarn.

3,606,771
YARN FEEDER CONTROL MECHANISM FOR CIRCULAR KNITTING MACHINES

Roland Peberdy, Wigston Magna, Leicester, England, assignor to The Bentley Engineering Company Limited, Leicester, England

Filed Sept. 11, 1968, Ser. No. 759,151
Claims priority, application Great Britain, Sept. 27,1967, 43,894/67
Int. Cl. D04b 15/58, 15/60
U.S. Cl. 66—133 9 Claims



A yarn feeder control mechanism in a circular knitting machine comprising a swivelling holder supporting a plurality of yarn feeders and means for swivelling the holder during introduction and withdrawal of feeders so as to avoid fouling open needle latches, has provided in association with one of the feeders, means for moving that feeder individually out of the range of open needle latches during its introduction and means for simultaneously preventing operation of the holder swivelling means. Such provision enables a supplementary (e.g. elastic) yarn to be introduced when setting up fabric on the needles.

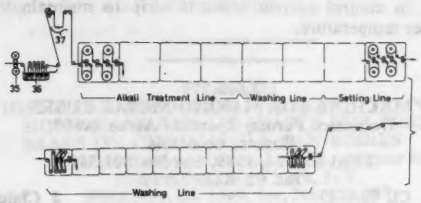
3,606,772
APPARATUS FOR TREATING CLOTH

Yoshikazu Sando and Hiroshi Ishidoshiro, Wakayama-ken, Japan, assignors to Sando Iron Works Co., Ltd., Wakayama-ken, Japan

Original application May 16, 1967, Ser. No. 638,971. Divided and this application Dec. 11, 1968, Ser. No. 782,890
Int. Cl. D06f 15/00
U.S. Cl. 68—9 2 Claims

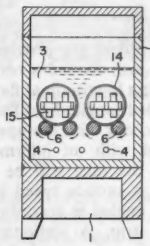
Apparatus for treating cloth is comprised of a pair of rollers, with at least one of the rollers having grooves formed in its circumferential periphery. The grooves may extend in parallel relationship with or transversely to the axis of the roller. Preferably, the grooved roller is formed of a hard substance and the other roller of a relatively softer substance whereby when the cloth is passed between the two, the grooves in the grooved roller exert a

lateral tensioning effect on the cloth. Further, the rollers may be arranged in combination with solution tanks for



passing the cloth through the tanks and concurrently laterally and longitudinally tensioning the cloth.

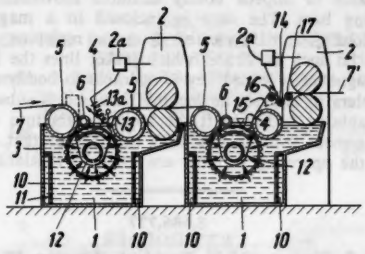
3,606,773
TEST DYEING APPARATUS
Kunio Tabata, Fukui-ken, Japan, assignor to Fukui Seiren Kako Kabushiki Kaisha, Fukui-ken, Japan
Filed July 18, 1969, Ser. No. 842,930
Claims priority, application Japan, July 20, 1968, 43/62,328
Int. Cl. B05c *3/08*
U.S. Cl. 68—15 **4 Claims**



Test dyeing apparatus comprising a frame, at least two driving rolls rotatably supported on said frame in a horizontal plane in parallel relationship at suitable distances, means for driving said driving rolls, hollow drums each adapted to be put on a pair of said adjacent driving rolls and held in tangential contact therewith so as to be driven thereby and tubular dyeing tanks for containing dyeing solution and material to be dyed, each of said tubular dyeing tanks being adjustably supported in said hollow drum so that the former may be set at a desired angle relatively to the latter.

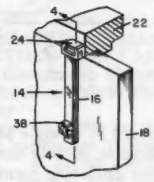
3,606,774
APPARATUS FOR THE CONTINUOUS WET-TREATMENT OF MATERIAL LENGTHS AND SILVER-TYPE MATERIALS
Heinz Fleissner, Egelsbach, near Frankfurt am Main, Germany, assignor to Fleissner GmbH
Filed Nov. 29, 1968, Ser. No. 785,006
Claims priority, application Germany, Nov. 29, 1967, P 16 35 111.4
Int. Cl. B05c *3/134, 3/136, 3/138*
U.S. Cl. 68—22 **18 Claims**

The present disclosure is directed to a process and apparatus for the continuous wet-treatment of textile materials which comprises introducing the material to be treated in radial loops onto the surface of a perforated conveying element, said conveying element being submerged in a treatment liquid, conveying the material being treated through the treatment liquid on the surface of said conveying element while simultaneously drawing the treatment liquid through the material from the outside of the conveying element to the inside thereof so that the material is penetrated by said treatment liquid and held to the conveying element, squeezing the material removed from the conveying element and controlling the speed of the conveying element and the speed of the



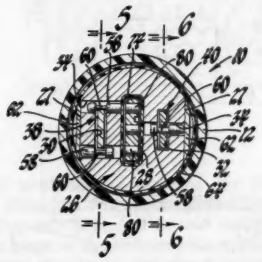
squeezer. The speed of the conveying element and the squeezer is controlled by a measuring unit disposed between the conveying element and the squeezer, said measuring unit acting upon a regulating element.

3,606,775
SURFACE BOLT
Norman C. Atkins, Franklin Park, Ill., assignor to Glenraven Corporation, Chicago, Ill.
Filed Aug. 17, 1970, Ser. No. 64,238
Int. Cl. E05b *65/06*
U.S. Cl. 70—129 **22 Claims**



The lock housing of the slidable bolt member of a surface bolt constitutes a handle by which the bolt is manually shiftable from extended, locked to retracted, unlocked positions, the lock housing containing a lock mechanism adapted to secure the bolt in either a fully locked or in a fully unlocked position only when the key to the locking mechanism has been removed from the lock.

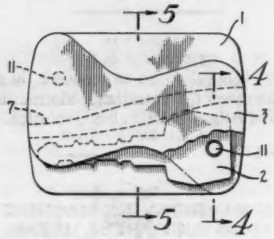
3,606,776
LOCK ASSEMBLY
George Drach, Jr., Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Apr. 17, 1970, Ser. No. 29,533
Int. Cl. E05b *27/00, 47/00*
U.S. Cl. 70—276 **4 Claims**



A lock assembly secure against unauthorized manipulation and against the intrusion of foreign matter and moisture, the assembly including a generally cylindrical non-magnetically sensitive core having a key slot therein

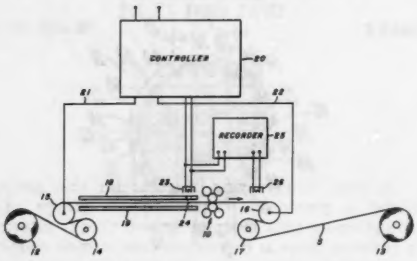
and slidably carrying a pair of non-magnetically sensitive locking bars and a plurality of magnetic tumblers operable to impede bodily shiftable movement of the locking bars. The core is enclosed in a magnetically pervious jacket fabricated from a moisture resistant material such as Teflon which jacket lines the key slot. A magnetically coded key is operable to bodily shift the tumblers to release the locking bars and is subsequently operable to bodily shift the locking bars into coupling engagement with an operating member so that the core and the operating member are unitarily rotatable.

3,606,777
KEY HOLDER
Jack C. Watson. 626 N. President, Wheaton, Ill. 60187
Filed Aug. 12, 1970, Ser. No. 63,132
Int. Cl. A47g *29/10*
U.S. Cl 70—458 **7 Claims**



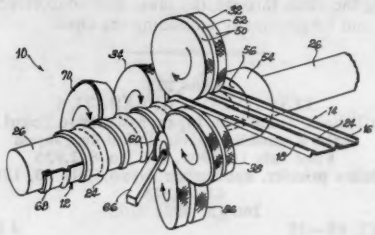
A key holder formed in a single plastic piece including a central flat rectangular portion connected to a pair of flat outer flexible key enclosing members by narrow web portions to form four key receiving compartments. Key pivot protrusions are formed each side of the central portion to locate and hold keys inserted into each compartment. The outer members are cut away to provide access to key in the compartment.

3,606,778
METHOD AND APPARATUS FOR WARM-ROLLING METAL STRIP
Howard B. Bomberger, Jr., Canfield, Ohio, assignor to Reactive Metals Inc.
Filed June 17, 1968, Ser. No. 737,483
Int. Cl. B21b *37/00, 27/06*
U.S. Cl. 72—13 **10 Claims**



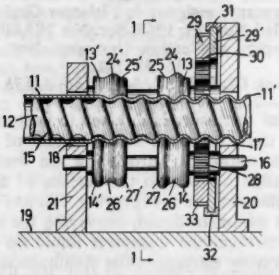
A method and apparatus for warm-rolling metal strip at an intermediate temperature of about 300 to 1400 F. The strip is contacted electrically at opposite sides of a roll stand, and thus heated by electric resistance. Temperature is sensed near the entry side of roll stand and used to control current input to strip to maintain the proper temperature.

3,606,779
MACHINE FOR MAKING METAL TUBES
Domenico Parma, Apartado Aereo 14600, Bogota, Colombia
Filed Feb. 24, 1969, Ser. No. 801,551
Int. Cl. B21c *37/12*
U.S. Cl. 72—49 **2 Claims**



A series of drive rollers are provided to feed a metal strip along a helical path around a rotating mandrel. The strip has an upstanding longitudinal flange along one edge thereof and a U-shaped longitudinal flange along the other edge, adapted to interlock with the upstanding flange. The strip is also formed with an intermediate longitudinal convolution so that the tube will be flexible. The drive rollers are driven at a surface speed greater than that of the mandrel and are angled in accordance with the helical pitch angle of the strip. A stationary member with a helical surface is disposed around the mandrel to guide the edge of the strip. The flanges are interlocked and then bent inwardly at an angle between a thin conical roller and one of the drive rollers which has a frusto-conical surface. The bent flanges are flattened by a roller which is angled more sharply than the drive rollers.

3,606,780
METHOD FOR MANUFACTURING HELICAL PIPE FOR HEAT EXCHANGERS
Kichisaburo Nagahara, 28 Yamamoto-cho Kita, 1-chome, Yao, Japan
Filed Nov. 18, 1968, Ser. No. 776,366
Claims priority, application Japan, Nov. 28, 1967, 42/76,626; June 28, 1968, 43/45,500
Int. Cl. B21d *13/04*
U.S. Cl. 72—77 **2 Claims**



A method for forming helical corrugated pipe. A cylindrical pipe is moved along a line corresponding to the

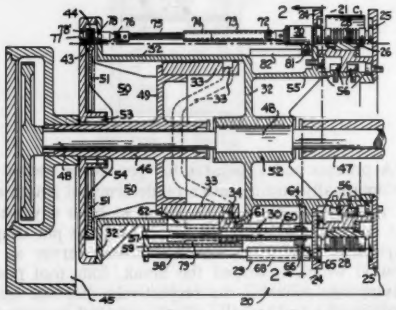
axis thereof over a metal core having a helical groove therein, and forming rollers are revolved around the pipe forming it against the core. The pipe can be revolved during the time it is fed along the core.

3,606,781

IDENTICAL PITCH-LINE VELOCITY TRANSMISSION MEANS FOR APPARATUS FOR FORMING BEADS ON CYLINDRICAL CAN BODIES

Dirk Vanderlaan, Alameda, Calif., assignor to Borden, Inc., New York, N.Y.

Filed Nov. 24, 1969, Ser. No. 879,197
Int. Cl. B21d *15/06, 19/00*
U.S. Cl. 72—94 9 Claims



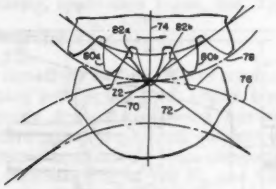
A non-slip, scratch proof medium for both the inner and outer surfaces of cylindrical can bodies as they are rolled between an internal beading die and a bead forming rail of a bead forming apparatus entailing disposing the can body at its point of tangent contact with the internal die and beading rail as close as possible to the pitch line of the main drive mechanism and enabling transmission of identical pitch-line velocity to the internal die despite its radial shifting due to the thickness of the can body material.

3,606,782

GEAR ROLLING METHOD AND APPARATUS

Warren C. McNabb, Detroit, and David W. Daniel, Birmingham, Mich., assignors to Lear Siegler, Inc., Santa Monica, Calif.

Filed Dec. 8, 1969, Ser. No. 883,037
Int. Cl. B21h *5/02*
U.S. Cl. 72—108 15 Claims



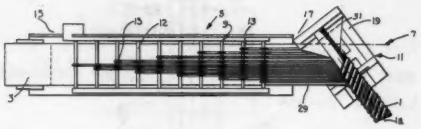
Gear rolling employing a gear-like die designed to operate with a work gear such that the operating pitch diameter lies outside or substantially outside the involute profile of the gear teeth, either radially outwardly beyond the involute profile or radially inwardly thereof.

3,606,783

SEGMENTED ROLL FOR FORMING HELICALLY CORRUGATED PIPE

Clarence P. Lewis, Carlisle, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Apr. 1, 1969, Ser. No. 811,972
Int. Cl. B21c *37/12;* B21f *3/02;* B23k *31/00*
U.S. Cl. 72—135 11 Claims



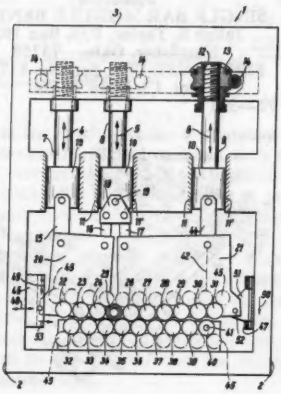
An improved segmented roll for forming helically corrugated pipe by curling an elongated strip of sheet metal having longitudinally extending, alternating ridges and valleys therein, into a helical convolution.

3,606,784

PANEL STRAIGHTENING MACHINE FOR THIN GAUGE SHEET METAL

Walter Schlüter, Geesthacht, Germany, assignor to Wilhelmsburger Maschinenfabrik Hinrichs & Sohn, Geesthacht, Germany

Filed Apr. 16, 1969, Ser. No. 816,601
Claims priority, application Germany, Apr. 20, 1968, P 17 52 211.1
Int. Cl. B21d *1/02*
U.S. Cl. 72—165 7 Claims



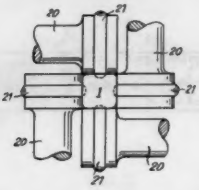
A panel straightening machine for thin gauge sheet metal is provided which comprises groups of upper straightening rolls mounted in two chocks tiltable about a common hinge at the bottom ends of their neighbouring sides, whereas the top of each chock is hingeably attached to two and preferably at least four press rods permitting the chocks to be adjusted by deflection about their common hinge.

3,606,785

APPARATUS AND METHOD FOR ELIMINATING OR REDUCING THE INTERNAL FLAWS OF SEMIFINISHED PRODUCTS, ESPECIALLY AT CAST INGOTS, BLOCKS, BLOOMS, SLABS, BILLETS OR THE LIKE

Erik A. Olsson, Kusnacht, Switzerland, assignor to Erik Olsson AG, Zurich, Switzerland

Filed Aug. 9, 1968, Ser. No. 751,484
Claims priority, application, Germany, Aug. 12, 1967, P 16 02 127.5
Int. Cl. B23p 17/00, 25/00
U.S. Cl. 72—199 5 Claims



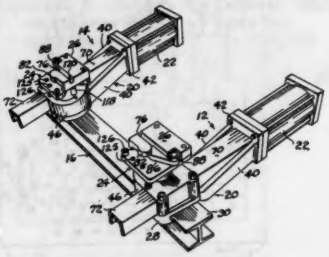
The invention discloses an apparatus and method for eliminating or at least reducing the internal flaws of semifinished products, especially at cast ingots, blocks, blooms, slabs, billets or the like. The inventive method comprises the steps of exerting a pressing force at only portion of at least one side surface of the semifinished product, and compressing the inner portions of the semifinished product by means of said pressing force, so that the portions of the semifinished product which have not been subjected to the pressing force provide resistance against a change in shape of the semifinished product, and therefore, at least partially prevent an elongation of such semifinished product. The inventive apparatus for the performance of the aforesaid method comprises means providing a pressing force-exerting edge which is smaller than the width of the surface of the semifinished product.

3,606,786

SINGLE BAR MODULE BENDER

Julian S. Taylor, P.O. Box 152, Kingfisher, Okla. 73750

Filed Apr. 17, 1969, Ser. No. 817,043
Int. Cl. B21d 11/04
U.S. Cl. 72—321 4 Claims



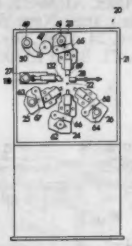
A bending machine including a rotatable shaft secured to one end of a pitman. Means on the bending machine loosely positions an end portion of a rod to be bent with the longitudinal axis of the rod extending diametrically across the axis of the shaft and forms an arcuate bending shoulder having its axis off-set laterally and toward the other end of the rod with respect to the free end of the pitman. Means on the free end of the pitman, on that side of the rod to be bent opposite the bending shoulder, force bends the rod around the bending shoulder in response to rotation of the shaft in one direction.

3,606,787

PROCESS FOR MANUFACTURE OF SPRING PINS HAVING A WAVE-SHAPED GROOVE AND APPARATUS THEREFOR

Yozaburo Umehara, 2–8–6 Skakujii, Nerima-ku, Tokyo, Japan

Filed Dec. 31, 1968, Ser. No. 788,128
Claims priority, application Japan, Nov. 28, 1968, 43/87,166
Int. Cl. B21d 39/02
U.S. Cl. 72—337 1 Claim



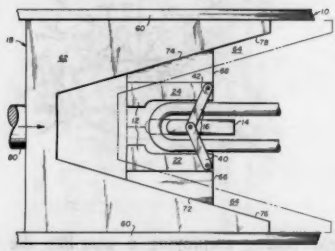
A process and apparatus for producing spring pins by automatically cutting into a predetermined length a length of rectangular plate blank so as to have a wave-shaped cut edge and winding the blank into the pin shape. The apparatus includes a mandrel which serves as a core around which is wound the blank, four tool posts each having one movable die respectively disposed outwardly peripherally and radially of said mandrel, a control device disposed upon the front side of the machine frame upwardly and to the left of said mandrel having a movable controlling member and a guide stand disposed upon the front side of the machine frame upwardly and to the right of said mandrel for guiding said blank, whereby the leading edge of the blank transferred along the guide stand is abutted against the controlling member so as to control the length of cut, thereafter the blank is cut into a predetermined length so as to have a wave-shaped cut edge by a pair of mating corrugated cutters formed on the opposed surfaces of the guide and the die of the tool post, the cut blank is wound around the mandrel by the dies of the tool posts, so as to form a spring pin having a wave-shaped groove and finally the mandrel is retracted so as to automatically drop thus formed spring pin.

3,606,788

SHORT-RADIUS SQUEEZE BENDING APPARATUS

Raymond C. Whitman, Wayland, N.Y., assignor to Foster Wheeler Corporation, Livingston, N.J.

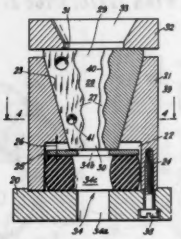
Filed Oct. 14, 1969, Ser. No. 866,200
Int. Cl. B21d 7/04
U.S. Cl. 72—389 3 Claims



A squeeze bending apparatus in which a tube blank, previously fabricated with a relatively wide bend, is

formed with a short radius tube bend. An inner die is operatively connected between a pair of outer dies for conjointly bringing the dies together at a uniform rate of movement such that short radius bends can be uniformly fabricated.

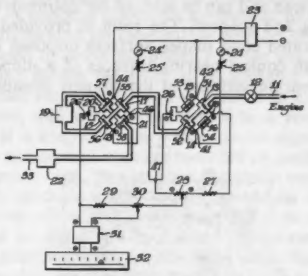
3,606,789
APPARATUS FOR MANUFACTURING A PUMP SPINDLE
Karel Kozusnik, Olomouc, Czechoslovakia, assignor to Sigma Lutin, narodni podnik, Olomouc, Czechoslovakia
Filed Apr. 9, 1969, Ser. No. 814,715
Int. Cl. B21d *41/00*
U.S. Cl. 72—402 **5 Claims**



A pump spindle has a screw-shaped configuration and is in the form of an elongated hollow tube of small wall thickness, carrying at one end a means through which a drive is transmitted to the pump spindle. The tube is given its required configuration by means of pressing jaws which press inwardly against the tube and which are suitably shaped so as to achieve the desired helical configuration of the hollow pump spindle. These jaws are supported not only for axial movement but also for radial movement toward and away from a given axis along which the tube is advanced and around which the tube is rotated, so that by advancing the tube in steps synchronized with the movement of the shaping jaws there will issue from an apparatus for manufacturing the pump spindle a tube of required configuration from which a section of predetermined length can be cut. Thereafter, a connecting means is fastened to one end of the thus cut tube to be able to transmit a drive to the tube through the connecting means.

3,606,790
METHOD FOR MEASURING AIR-FUEL RATIO
Hiroshi Matsumoto and Kenji Goto, Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Aichi Prefecture, Japan
Filed Jan. 21, 1969, Ser. No. 792,430
Claims priority, application Japan, Jan. 23, 1968, 43/3,485
Int. Cl. G01n *27/18*
U.S. Cl. 73—27 **1 Claim**

Method for measuring air-fuel ratio of combustible mixture by analyzing exhaust gas from engine supplied with mixture comprises steps of comparing thermal conductivity of standard gas with thermal conductivity of gas sample and thereafter obtaining from comparison a first voltage value representative of the H_2 and CO_2 content of the exhaust gas. Thermal conductivity of exhaust gas sample is then compared with exhaust gas sample having no CO_2 content and from comparison second voltage value representative of CO_2 content of exhaust gas sample is obtained. Second voltage value is subtracted from first voltage value to thereby obtain third voltage value representative of air-fuel ratio of combustible mixture. Ratio of second voltage value to first voltage value is constant somewhere between less than ten and more than one.



3,606,791
ULTRASONIC INSPECTIONS USING POLYSULFONE RESINS AS COUPLANTS
Richard P. Rathburn, Richmond, and Garth M. Stanton, San Anselmo, Calif., assignors to Chevron Research Company, San Francisco, Calif.
No Drawing. Continuation-in-part of application Ser. No. 809,029, Mar. 20, 1969. This application Mar. 16, 1970, Ser. No. 20,069
Int. Cl. G01n *24/00*
U.S. Cl. 73—71.5 **7 Claims**

A process is disclosed for making ultrasonic inspections of high surface temperature objects by using a polysulfone resin as a couplant. Surface temperatures of the object at the point of inspection are 400°–1,100° F. or higher.

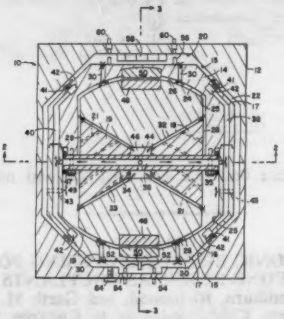
3,606,792
THERMOMETER FOR REFRIGERATOR
Tsuyoshi Yoshimoto, 727 Numame, Isehara-machi, Kanagawa, Japan
Filed Feb. 18, 1969, Ser. No. 800,131
Int. Cl. G01k *1/08, 7/04, 6/04*
U.S. Cl. 73—341 **9 Claims**

A thermometer for monitoring the temperature of both the inside and the outside of commodities, such as meat, fish, etc., being refrigerated. A hollow probe or a protection tube is made of a fluoro resin such as polytetrafluoroethylene and inserted into the commodities being refrigerated. A thermometer element, such as a thermocouple, a temperature sensitive mercury thermometer element, or a temperature sensitive alcohol thermometer element, is placed in the probe. Temperature indication can be made either at the outlet of the probe or at a centralized control room by feeding signals carrying information related to the output from the thermometer element to the control room.

3,606,793
SELF-GENERATING HYDROSTATIC SUPPORT FOR GYROSCOPES
James V. Johnston, Huntsville, Ala., assignor to the United States of America as represented by the Secretary of the Army
Filed Oct. 3, 1969, Ser. No. 863,596
Int. Cl. G01c *19/20*
U.S. Cl. 74—5 **7 Claims**

A gyroscope having a hydrostatic support for its output axis without the need for externally pressurized sys-

tems. The gyro is completely hermetically sealed against all environments to provide an internal gas which will always be clean and can be selected for optimum efficiency of pumping and support. The rotor is provided with internal truncated cone shaped surfaces disposed in spaced relation with conical bearing surfaces of a support member. The bearing surfaces of the support member is provided with a plurality of spiral grooves disposed in communication with the passages (opening) between the rotor and support member. These passages communicate with a plurality of passages between the gyro outer housing and inner cylinder to receive the gas therefrom for support of the rotor. The inner cylinder is also supported on gas disposed in passages provided between the outer housing and inner cylinder.

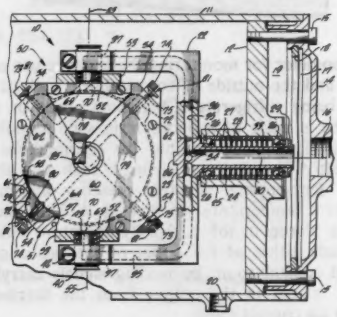


3,606,794

AIR-DRIVEN GYROSCOPE ERECTION SYSTEM WITH SEAL-FREE GIMBAL CONNECTIONS

Irven H. Culver, Playa Del Rey, Calif., assignor to Southwestern Industries, Inc., Los Angeles, Calif.

Filed Apr. 28, 1969, Ser. No. 819,765
Int. Cl. G01c *19/12*
U.S. Cl. 74—5.43 10 Claims



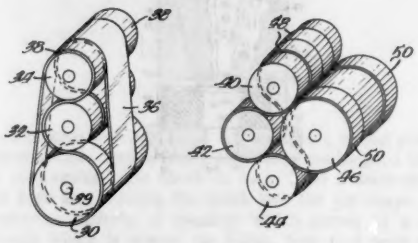
An erecting system for a vertical gyroscope useful in aircraft attitude-indicating instruments and the like. A gimbal-supported housing in the gyro encloses a gyro rotor, and is supplied with air which drives the rotor. Air is exhausted from the housing through four downwardly directed outlet ports at the corners of the housing undersurface. Control vanes are pendulously supported on the housing and extend beneath the outlet ports to intercept the exhaust air streams and thereby impart torques to the gyroscope tending to erect the rotor spin axis into a substantially vertical position. Air passages through outer and inner gimbals supply air to the housing, and the passages are configured so a pressure differential exists across a rotary connection between the inner and outer gimbals. A pressure drop occurs going from the outer gimbal to the inner gimbal or rotor housing, whereby air delivered to the rotor does not tend to leak outwardly through the rotary connection and the need for bulky and friction-producing seals is eliminated.

3,606,795

FRICTIONLESS MECHANICAL MOTION DEVICES

Leonard B. Simons, 516 S. Austin Blvd., Oak Park, Ill. 60304

Filed Sept. 29, 1969, Ser. No. 861,692
Int. Cl. F16h *21/16;* F16c *17/06*
U.S. Cl. 74—25 3 Claims



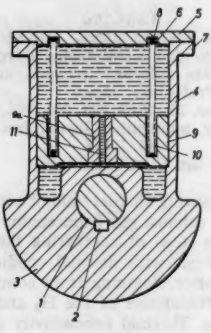
A frictionless mechanical motion device comprising at least two generally cylindrical rollers having their cylindrical axes parallel to each other and at least two flexible bands under tension and engaging portions of the peripheral surfaces of both of the rollers and trained thereabout in non-identical paths to confine the rollers for conjoint relatively frictionless movement.

3,606,796

VIBRATORY SOIL COMPACTING APPARATUS

Rudolf Pappers, Monchen-Gladbach, Germany, assignor to Bopparder Machinenbaugesellschaft m.b.H., am Guterbahnhof, Boppard am Rhine, Germany

Filed June 24, 1969, Ser. No. 836,092
Claims priority, application Germany, June 29, 1968, P 17 84 029.8
Int. Cl. F16h *33/10*
U.S. Cl. 74—87 4 Claims



The invention is concerned with an unbalanced centrifugal force generator for a vibratory soil compacting apparatus, the generator comprising a rotary shaft, a first

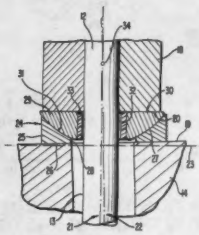
unbalanced eccentric mass mounted on said shaft at a fixed distance from said shaft, a second unbalanced eccentric mass, means mounting said second mass on said shaft for movement radially thereof whereby said second mass can move radially outwardly centrifugally upon rotation of said shaft, and spring means opposing said radial outward movement.

3,606,797

POLISHING ROD ALIGNMENT BEARING IN WELL PUMPING APPARATUS

George G. Browning, Jr., P.O. Box 5791, Longview, Tex. 75601

Filed Sept. 9, 1969, Ser. No. 856,309
Int. Cl. F16h *21/04*
U.S. Cl. 74—102 8 Claims



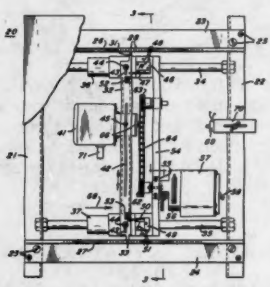
A two-part self-aligning thrust bearing is interposed between the top face of the carrier bar and the bottom face of the polished rod clamp in surrounding relationship to the polished rod. The arrangement relieves the polished rod of bending stresses which occur when there is misalignment of the bottom surface of the clamp or top surface of the carrier bar with respect to the axis of the polished rod.

3,606,798

CARRIAGE APPARATUS FOR SCANNING MEANS

Harry Leiter, Lower Merion Township, Montgomery County, Pa. (107 Henley Road, Philadelphia, Pa. 19151)

Original application Apr. 6, 1965, Ser. No. 445,959, now Patent No. 3,465,145, dated Sept. 2, 1969. Divided and this application June 20, 1968, Ser. No. 791,197
Int. Cl. F16h *27/02*
U.S. Cl. 74—112 7 Claims



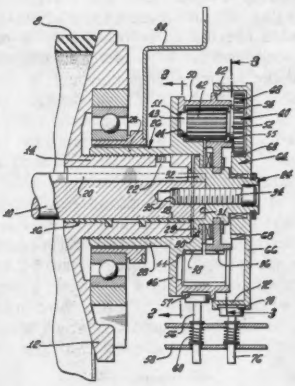
Means for recording data corresponding to the distribution and concentration of radio active sources detected over a scanning region together with means for converting said recorded data into a visual display at any desired time and as often as may be required. A scintillation detector is mounted for linear movement in opposite directions along a carriage which is itself mounted for linear movement in opposite directions orthogonal to the directions of movement of the scintillation detector, the carriage being actuated to move the detector to the next adjacent scanning line during the reversal of scanning direction. Output signals from the detector are routed to signal processing means, and after processing, data is recorded on one track of a magnetic tape while control signals generated at the end of each scan are recorded on another track of the magnetic tape. The read out apparatus may include an intensity modulated light source secured on a carriage for rectilinear movement in opposite directions at a constant speed to cause the modulated light beam to traverse an underlying photographic film, while the carriage itself is also shiftable in a direction along a line orthogonal to the scanning motion of the light source so that movements of the light source may duplicate those of the radiation detector scanning device. The recorded signal may be adjusted to provide an output for producing the required exposure of the film avoiding a new scanning operation over the radiation source for obtaining adjustments in the exposure to provide the required information in a photographic record or in the display of the information on a cathode ray tube face.

3,606,799

PLANETARY GEAR SYSTEM FOR SPEED CHANGING OF VARIABLE RATIO TRANSMISSIONS

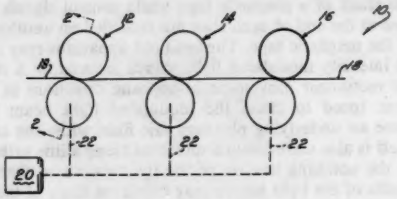
Willard R. Detwiler, Lawndale, Calif., assignor to Emerson Electric Co., St. Louis, Mo.

Continuation-in-part of application Ser. No. 730,798, May 21, 1968. This application Feb. 4, 1970, Ser. No. 8,496
Int. Cl. F16h *55/52*
U.S. Cl. 74—230.17 7 Claims



A slidable pulley section of a variable ratio transmission is adjusted on its shaft to change the transmission ratio by the aid of an auxiliary reversible planetary gear drive. The auxiliary drive connects the shaft of the main transmission itself to the slidable pulley section. Parts operable manually or by remote control initiate operation of the normally idle planetary gear mechanism. The variable ratio transmission mechanism maintains its adjustment until the auxiliary planetary drive is operated. The auxiliary drive is mounted so that it can be removed in a unit in a very simple manner, thus to facilitate belt change of the main variable ratio transmission mechanism. By a unique arrangement of guiding tracks, no spider is necessary to maintain the planet gears in position.

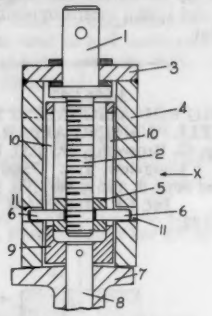
3,606,800
PRINTING PRESS DRIVE
Ernest H. Treff, Groton, Conn., and Henry M. Clarke, Jr., Westerly, R.I., assignors to Harris-Intertype Corporation, Cleveland, Ohio
Filed Apr. 20, 1970, Ser. No. 30,140
Int. Cl. F16d *11/10*; F16h *1/16, 57/00*
U.S. Cl. 74—405 8 Claims



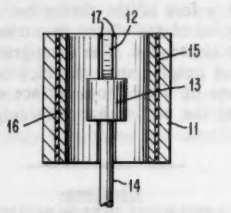
A printing press includes a pair of cylinders for simultaneously printing material. The cylinders have shaft ends thereon for support thereof. The press also includes a drive means for transmitting torque from a source of power to one of the cylinders. The drive means includes a worm drivingly connected to the source of power which transmits torque to another gear meshing therewith. The drive means also includes a clutch which has a body rotatably mounted about one of the shaft ends of the cylinders and has a circumferential surface portion thereabout. The body has a radial flange extending from the circumferential surface portion. The other gear, which meshes with the worm, has a centrally located aperture therein and receives the circumferential surface portion of the body. The other gear is mounted on the body such that its rotational axis is coextensive with the rotational axis of the shaft end upon which the clutch body is mounted. The other gear has first and second sides adjacent to the centrally located aperture. The other gear is positioned on the body such that the first side is adjacent to the radial flange and the second side is adjacent to a portion of a first member so that the flange engages the first side and the first member engages the second side of the other gear. When a clamping force is provided on the other gear between the radial flange of the body and the first member, torque is transmitted from the other gear to the body and first member. A second member is secured to the shaft end of the cylinder and a third member is nonrotatably secured to the body and first member. The third member is movable with respect thereto between a first or torque transmitting position in which a portion of the pin member is engaged with the third member and a second or disengaged position in which a portion of the pin member is no longer engaged with the third member.

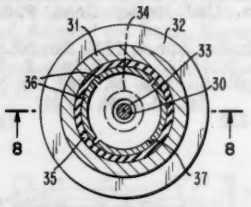
3,606,801
ROTARY ACTUATOR
Bernard D. Williams, Trench, near Wellington, England, assignor to Serck Industries Limited, Birmingham, England
Filed Oct. 23, 1969, Ser. No. 868,819
Claims priority, application Great Britain, Nov. 18, 1968, 54,545/68
Int. Cl. F16h *1/18*
U.S. Cl. 74—424.8 5 Claims

A rotary actuator for providing a slow-motion drive to the spindle of a fluid-controlling valve, from an axially aligned input shaft. The input shaft is threaded and carries a nut having two projections which pass through lengthwise slots in a surrounding sleeve and also engage helical slots in a stationary casing. The sleeve is secured to the valve spindle. Axial movement of the nut also causes the nut to be rotated slowly by the action of the helical slots upon the projections. The sleeve is rotated by the projections and drives the valve spindle. The axial extent of the slots in the sleeve is greater than the extent of the helical slots. No axial load is therefore transmitted to the valve spindle.



3,606,802
VIBRATION-DAMPED ROTATABLE CYLINDRICAL MEMBER
Kenneth Tsunoda, 625D Closter Dock Road, Closter, N.J. 07624
Filed Aug. 5, 1969, Ser. No. 847,683
Int. Cl. F16f *15/10*
U.S. Cl. 74—574 12 Claims



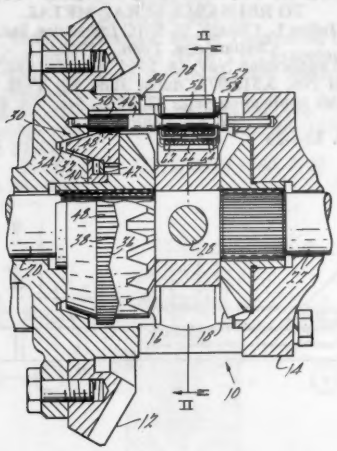


The noise generated in driving pulleys and like rotatable cylindrical members by contact with a moving belt is appreciably diminished by coating one surface of the cylindrical member with a viscoelastic material and adhering a rigid material to the exposed surface of the viscoelastic material.

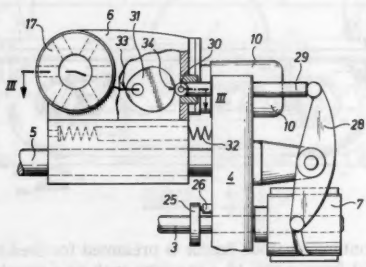
3,606,803
CENTRIFUGAL ACTUATOR FOR LIMITED SLIP DIFFERENTIAL
William C. Ottemann, Union Lake, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio
Filed Sept. 17, 1969, Ser. No. 858,700
Int. Cl. F16h *1/44*; F16d *43/24*
U.S. Cl. 74—711 31 Claims

A limited slip differential mechanism having a normally disengaged main clutch producing lock-up when activated, which is operated by means of an actuator device in turn activated by a predetermined level of differential

action which is varied with the rate of change of levels of differential action. The actuator includes an actuator member which is rotationally driven by differential action and upon which spring-biased centrifugal weights are pivotally mounted and arranged so that at a predetermined velocity and acceleration of the actuator member one of the weights moves outwardly and applies a braking force to the actuator member inhibiting its rotation. An arrangement is provided for actuation of the normally disengaged main clutch in response to this inhibited rotation, so that the differential action is uninhibited at low levels of differential action. A high road speed cut out of the actuator is also provided so that no lock-up will occur at relatively high road speeds.

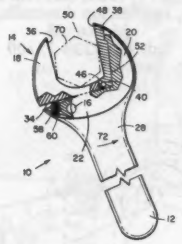


3,606,804
DEVICE FOR THE APPLICATION OF A TURRET HEAD TO A WORKPIECE
Max Gotz, 2 Monbachweg, 722 Schwenningen (Neckar), Germany, and Werner Sonnek, 76 Breslauerstrasse, 7313 Reichenbach (Fils), Germany
Filed July 1, 1969, Ser. No. 838,295
Claims priority, application Germany, July 10, 1968, G 67 50 293
Int. Cl. B23q *17/18*
U.S. Cl. 74—820 **5 Claims**



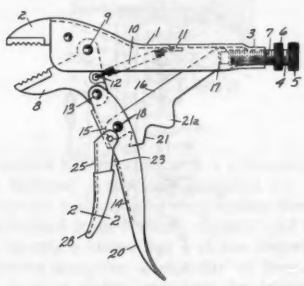
An apparatus for the application of a turret head to a workpiece wherein the feed or advancing movement of the turret head is derived from a first control cam mounted upon a main control shaft and wherein the displacement movement which occurs in connection with the indexing of the turret head is derived from a second control cam. The displaceable turret head is adapted to be held against the two control cams by means of a spring. According to important aspects of the invention, the second control cam is disposed between a transmission member cooperating with the first control cam and a shaft rotating with the switch gear of the turret head and mounted in the housing of the turret head.

3,606,805
RATCHET-ACTION OPEN-END WRENCHES
Lloyd R. Dyck, 20 Skipton Court, Downsview, Ontario, Canada
Filed July 1, 1969, Ser. No. 838,225
Int. Cl. B25b *13/28*
U.S. Cl. 81—91B **5 Claims**



A ratchet-action open-end wrench of simple and inexpensive but structurally strong construction has a first jaw pivotally mounted on a handle with a second jaw pivotally mounted on the first jaw so that, when the wrench is rotated in one direction, the jaws drivingly engage a nut or bolt disposed between the jaws. When the wrench is moved in the reverse direction, the pivoting of the first jaw with respect to the handle permits the second jaw to pivot with respect to the first jaw thereby increasing the transverse separation between the jaws and allowing the wrench to be moved about the nut in non-driving engagement therewith.

3,606,806
PLIERS
Frank Patrick, Meadville, Pa., assignor to Channellock, Inc., Meadville, Pa.
Original application May 9, 1968, Ser. No. 727,815, now Patent No. 3,545,315, dated Dec. 8, 1970. Divided and this application Mar. 16, 1970, Ser. No. 19,889
Int. Cl. B25b *7/12*
U.S. Cl. 81—368 **3 Claims**



The release of toggle pliers having a toggle consisting of a toggle link and an actuating lever is effected by a

release lever having its forward end pivoted on the actuating lever and having a rearwardly extending hand grip portion adjacent the hand grip portion of the actuating lever. In the pressure position, a projection on the toggle link to the rear of the pivot holds the release lever spaced from the actuating lever.

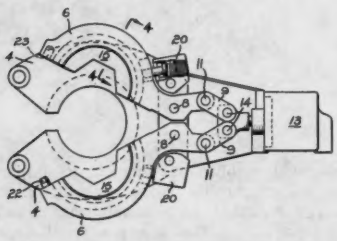
ERRATUM

For Class 81—91 see:
Patent No. 3,606,805

3,606,807
BAR FEED TUBES OF LATHES

Wlodzimierz Rast, Eden Hills, South Australia, Australia, assignor to Rast Patents Pty. Ltd., Adelaide, South Australia, Commonwealth of Australia

Filed Apr. 7, 1969, Ser. No. 813,976
Claims priority, application Australia, Apr. 10, 1968, 36,286/68
Int. Cl. B23b *25/00*
U.S. Cl. 82—38R 5 Claims

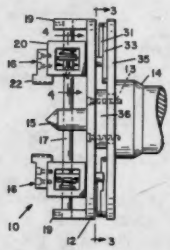


A bar feed for lathes wherein relatively long bars are fed through a tube by a push rod which is characterised by at least one bar steady in an opening in the feed bar tube comprising jaws coaxially arranged about the bar and guiding the bar when the bar is of a length to extend beyond the steady, but permitting the bar to slide through the steady when the jaws are opened as the push rod reaches the said steady.

3,606,808
QUICK-ACTING CHUCKS

Jerry L. Bowden, R.R. Box 312, Crete, Ill. 60417

Filed Nov. 25, 1969, Ser. No. 879,692
Int. Cl. B23b *33/00*
U.S. Cl. 82—40 8 Claims

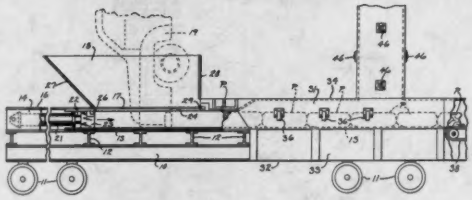


A rotatable carrier has a work supporting center and a shaft extending radially outwardly from the center. Coacting jaw units are freely slidable on the shaft toward and away from the center and are provided with cam-actuated locking plates. The plates when unlocked slide freely on the shaft, but are cantable by cam action to a locking grip with the shaft, whereupon further cam action brings the jaw units into clamping engagement with work on the center.

3,606,809
METHOD OF CONVERTING JUNKED VEHICLES TO REUSABLE SCRAP METAL

Julius L. Chazen, % SMC Industries, Inc., Chattanooga, Tenn. 37401

Original application Nov. 14, 1966, Ser. No. 594,203, now Patent No. 3,518,078, dated June 30, 1970. Divided and this application Sept. 22, 1969, Ser. No. 859,774
Int. Cl. B30b *9/00*
U.S. Cl. 83—23 5 Claims

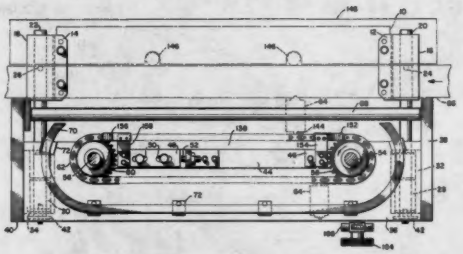


A method in which junked items such as automobiles are supported endwise in upright position and in which a ram-type shear is moved back and forth transverselly of the lower portion of the supported article to shear off similarly sized portions thereof, one after another, while advancing each portion out of the way during the shearing stroke and while causing the junked item to be fed in a downwardly direction to present successive lower portions to the shearing stroke.

3,606,810
CONTINUOUS STOCK FEEDER

Eugene Kozij, Warwick, R.I., assignor to Rogers Corporation, Rogers, Conn.

Filed May 28, 1969, Ser. No. 828,500
Int. Cl. B26d *5/30*
U.S. Cl. 83—71 13 Claims



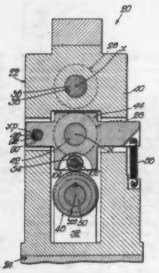
A continuous stock feeder is presented for feeding strip material from a coil to a machine such as a punch press. The continuous stock feeder has a plurality of chain driven gripper elements which are selectively caused to engage the strip material and advance the material in a programmed manner into the working machine. The grippers are jaw type elements spaced about a continuous chain, and the gripper elements are caused to be mounted

on a guide bar when the jaws are in engagement with the material to be advanced. A programmed control such as a numerical punch tape may be employed to selectively advance the grippers and selectively actuate the working machine so that continuous advancement of the material and proper actuation of the working machine are coordinated.

3,606,811
ROTARY SHEAR

Karl W. Hallden, deceased, late of Thomaston, Conn., by The Colonial Bank and Trust Co., executor, Waterbury, Conn., assignor to The Hallden Machine Company, Thomaston, Conn.

Original application Nov. 25, 1968, Ser. No. 778,593. Divided and this application June 30, 1970, Ser. No. 51,274
Int. Cl. B23d *25/12*; B26d *1/40, 7/26*
U.S. Cl. 83—305 **7 Claims**

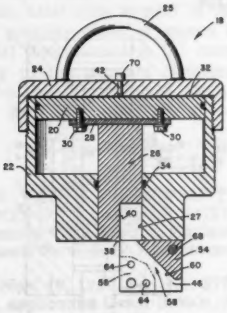


For cutting coordination of shear blades which are non-adjustably locked directly to the companion shear drums of a rotary shear, the opposite end bearings of one of the shear drums are mounted in the shear frame for individual adjustability in two transverse directions one of which is to and from the axis of the other shear drum.

3,606,812
UNDERWATER CABLE CUTTER

Raymon C. Riordan, Arcadia, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Feb. 16, 1970, Ser. No. 11,525
Int. Cl. B26d *5/12*
U.S. Cl. 83—453 **11 Claims**

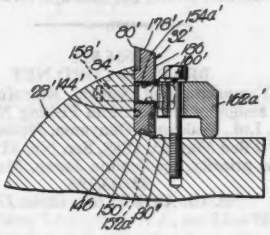


An underwater cable cutter including: a piston and a cylinder, the cylinder being closed at a top end; the piston having a rod which slidably extends through the bottom end of the cylinder; the bottom end of the rod having a cutting edge which is capable of cutting a cable; means mounted on the cylinder for retaining a cable for cutting by said cutting edge; and an aperture in the cylinder for introducing sea pressure for actuating said piston.

3,606,813
ROTARY SHEAR

Karl W. Hallden, deceased, late of Thomaston, Conn., by The Colonial Bank and Trust Company, executor, Waterbury, Conn., assignor to The Hallden Machine Company, Thomaston, Conn.

Original application Nov. 25, 1968, Ser. No. 778,593. Divided and this application July 16, 1970, Ser. No. 55,371
Int. Cl. B26d *1/40*
U.S. Cl. 83—672 **6 Claims**

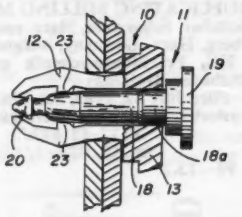


Companion drums of a rotary shear have machined shoulders and bottom rests slanting from the shoulders, and shear blades for the drums have each a front face and parallel slanting top and bottom surfaces and a cutting edge at the junction of the front face and top surface, with each blade resting with its bottom surface flush on the bottom rest of a drum when its front face is located on the shoulder of the same drum.

3,606,814
RELEASABLE REUSABLE EXPANDING FASTENER

James A. MacKenzie, Apt. 601, 100 Bronson Ave., Ottawa, Ontario, Canada

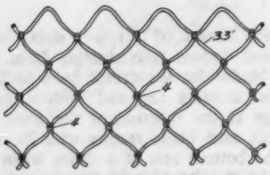
Filed Feb. 17, 1969, Ser. No. 799,689
Claims priority, application Canada, Feb. 23, 1968, 13,256
Int. Cl. F16b *13/04*
U.S. Cl. 85—84 **2 Claims**



This invention is concerned with a releasable, reusable, expanding fastener particularly intended for adjustably securing together slotted metal construction elements. The fastener is formed from resilient material and consists of two parts, namely a sleeve and a sleeve expanding member. The sleeve comprises a plurality of finger members extending from a flange member shouldered at right angles to the major axis of the sleeve. The expanding member comprises a cylindrical shaft provided with a flange at one end, a tapered head at the opposite end, a

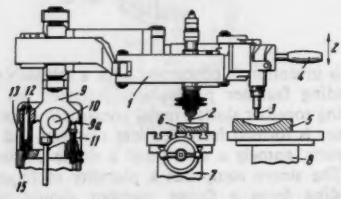
locking recess just inwardly of the head and a gradually tapering camming surface extending rearwardly of the locking recess. The fingers have locking shoulders which are generally complementary in shape to the locking recess on the shaft of the expanding member. These shoulders are located on the inner surfaces of the fingers, substantially midway there-along. The head on the shaft and the locking shoulders co-operate with one another to retain the expanding member within the sleeve when the latter is in an unexpanded condition, and, when the sleeve and expanding member have been passed through a pair of aligned apertures with the sleeve in the unexpanded condition, the expanding member may then be driven forwardly within the sleeve towards the ends of the fingers whereupon the locking shoulders will co-operate with the camming surface on the sleeve to expand the fingers and securely fasten the sleeve and expanding members within the said apertures.

3,606,815
BRAIDED CORD NET
Shigeru Yamashita and Satoshi Kawafuchi, Wakegun, Japan, assignors to Morishita Fishing Net Manufacturing Co. Ltd., Wakegun, Okayama, Japan
Filed May 23, 1969, Ser. No. 827,225
Claims priority, application Japan, May 25, 1968, 43/43,195
Int. Cl. A01k *73/00*; D04c *1/06*
U.S. Cl. 87—12 **3 Claims**



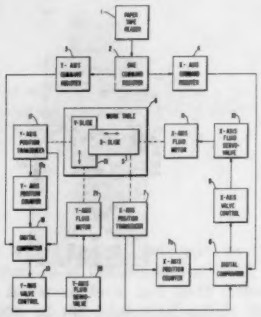
A fish net made of braided cord with the meshes connected by knots. The cord is braided from a group of strands twisted in one direction, and another group of strands twisted in the other direction, and alternating with the strands of the first group. The lay of the cords may be in the same direction of the twist or, in another modification, the lay may be in a direction opposite to the twist.

3,606,816
AUTOMATIC STEP FEED DEVICE FOR DUPLICATING MILLING MACHINES
Albert Blottcher, Scharzfeld, Harz, and Hans Maass, Bad Lauterberg, Harz, Germany, assignors to Franz Kuhlmann KG, Prazisionsmechanik und Maschinenbau, Wilhelmshaven, Germany
Filed July 22, 1969, Ser. No. 843,327
Claims priority, application Germany, July 22, 1968, P 17 52 827.7
Int. Cl. B23c *1/16*
U.S. Cl. 90—13.1 **6 Claims**



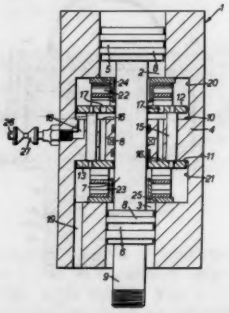
A step feed device for duplicating milling machines equipped with a pantograph operated by an adjustable stop which is provided with a spindle screwed into a threaded sleeve and arranged for displacement in a casing. The sleeve is biased by a spring at one end thereof and during displacement of the sleeve in the casing a rotary control device engages the sleeve so that it can turn in only a single direction with respect to the spindle. To obtain a step feed, the pantograph need only be lifted so that the threaded sleeve can be shifted by the spring and then lowered again to thereby change the working plane or level of the pantograph.

3,606,817
FLUIDIC POSITIONING CONTROL SYSTEM
Lawrence W. Langley, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Apr. 29, 1969, Ser. No. 820,166
Int. Cl. F15b *21/02*
U.S. Cl. 91—37 **4 Claims**



An all-fluidic positioning control system overcoming frequency limitations by decoding to determine least significant actual position indications, while counting to determine more significant indications. Actual position and desired position are fluidically compared to generate a position correction signal.

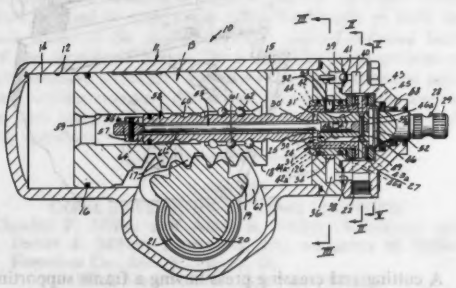
3,606,818
FLUID-OPERATED RECIPROCATING MOTORS
Helmut Hirn, Dusslingen, Germany, assignor to Rilco Maschinenfabrik G.m.b.H. & Co. K.G.
Filed June 27, 1969, Ser. No. 837,126
Claims priority, application Germany, July 3, 1968, P 17 03 726.2
Int. Cl. F01l *15/18, 31/00*
U.S. Cl. 91—329 **13 Claims**



A reciprocating fluid operated motor including two interconnected spaced co-axial pistons of different diameters lying in two corresponding spaced cylinders separated

by an intermediate wall, means for introducing pressure fluid on one side of the wall and for exhausting fluid from the other side of the wall and automatic valve means controlling the flow of fluid through passages in the wall including two valve plates interconnected by spacers of greater effective length than the thickness of the wall. One valve plate is arranged to close the through passages and the other plate has aligned openings but is arranged to close the outlet duct. The motor may also include automatic valve mechanism to hold the reciprocating pistons stationary at one end of their travel.

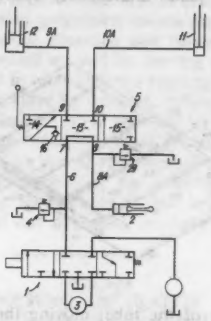
3,606,819
POWER STEERING GEAR ASSEMBLY
Fredrick D. Venable and Raymon L. Goff, Lafayette, Ind., assignors to TRW Inc., Cleveland, Ohio
Filed June 4, 1969, Ser. No. 830,275
Int. Cl. F15b *9/10, 11/08, 13/04*
U.S. Cl. 91—375A **8 Claims**



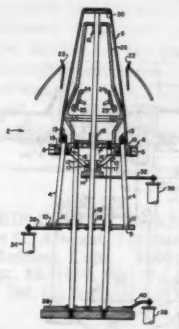
A power steering gear assembly including a centrally bored rack toothed piston dividing a power cylinder in a pair of fluid pressurized chambers, a sector gear meshing with the piston, a valve assembly communicating the pressure chambers with a source of pressurized fluid and including a pair of sleeve valves nested together in telescopic relation, a centrally bored worm connected to the outer sleeve valve for joint rotation and extending into the bore of and connected to the piston to cause rotation of the worm in response to axial movement of the piston, an operating shaft connected to the inner sleeve valve for joint rotation and a torsion rod providing follow-up movements between the sleeve valves, the torsion rod extending into the bore of the worm, which worm bore in turn communicates certain axial slots formed in the outer sleeve valve with the pressure chamber spaced farthest therefrom, other axial slots formed in the outer sleeve valve opening directly to the pressure chamber immediately adjacent the valve assembly and fluid inlet and outlet ports communicating with the axial slots through the inner sleeve valve.

3,606,820
SELECTOR VALVE FOR SIMULTANEOUS OPERATION OF MULTIPLE ACTUATORS
Alfred W. Thomas, Earl Shilton, England, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles
Filed Nov. 10, 1969, Ser. No. 875,004
Claims priority, application Great Britain, Nov. 11, 1968, 53,282/68
Int. Cl. F15b *11/16*
U.S. Cl. 91—413 **6 Claims**

A hydraulic control system is provided for a motor vehicle having a plurality of hydraulically operated attachments and includes valve means for controlling hydraulic pressure so that a constant hydraulic pressure may be supplied to one of the said attachments while an intermittent hydraulic pressure is supplied, simultaneously, to another attachment.



3,606,821
APPARATUS FOR CUFFING NEST OF BAGS
Hsue C. Tsien, Livingston, N.J., assignor to Esso Research and Engineering Company
Filed May 28, 1969, Ser. No. 831,818
Int. Cl. B31b *1/00*
U.S. Cl. 93—8R **12 Claims**

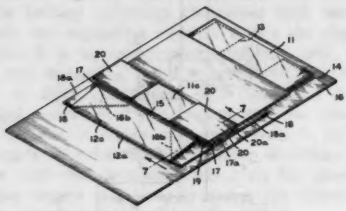


An apparatus for cuffing a plurality of nested bags. The bags are disposed on a bag supporting frame of the apparatus and held thereto by bag holding means. Means are provided for turning the ends of the nested bags over the bag holding means thus providing the bags with cuffs.

3,606,822
METHOD AND APPARATUS FOR PRODUCING A FLAT-BOTTOM PLASTIC BAG
Gerald M. Platz, Champaign, and James B. Honn, Arcola, Ill., assignors to National Distillers and Chemical Corporation, New York, N.Y.
Filed Jan. 12, 1970, Ser. No. 2,020
Int. Cl. B31b *49/04*
U.S. Cl. 93—35SB **8 Claims**

A flat-bottom plastic bag produced from an extruded length of gusseted thermoplastic material and a method for the production thereof including the steps of sealing and severing a length of such material to provide

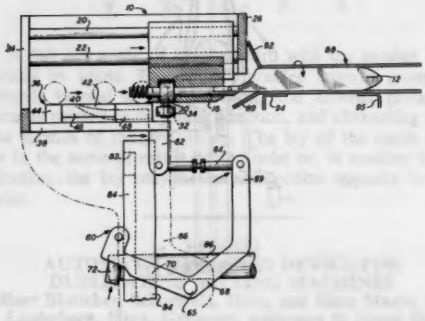
a closed bottom; retaining the major portion of said sealed tube including the open mouth against longitudinal movement; grasping opposed edges of the top wall of said tube adjacent the sealed bottom; lifting the grasped top wall to a plane immediately above that of the retained portion of the tube; moving the grasped portion of the tube toward the open mouth of the bag a predetermined distance to also carry the bottom wall of the tube therewith; and folding the moved portion of the tube to create a finished bag having a sustaining flat-bottom portion when opened.



3,606,823
APPARATUS FOR OPENING AND PARTIALLY ERECTING FOLDED AND COLLAPSED CARTONS

Russell W. Allen, Pompton Plains, N.J., assignor to Container Equipment Corporation, Bloomfield, N.J.

Filed Apr. 20, 1970, Ser. No. 29,939
Int. Cl. B31b *1/78*
U.S. Cl. 93—53R **9 Claims**

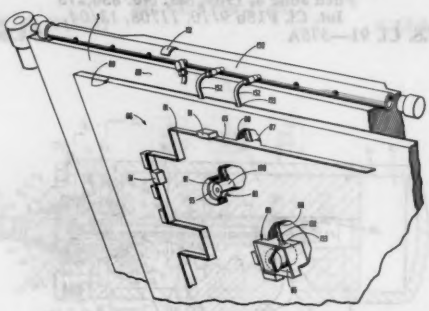


A flat blade element is reciprocated into and out of folded, collapsed cartons positioned endwise relative to the forward end of the blade element. The blade, in addition to reciprocation, is adapted to rotate selectively about a longitudinal axis under the influence of a torsional biasing force and a cam follower. The cam follower rides over a linear cam surface on the outward stroke of the blade to initially enter the interior of the carton with the flat blade in a horizontal attitude. The blade cam follower leaves the linear cam surface when the blade reaches the terminal end of its outward stroke. At this point the torsional biasing force is effective to rotate the blade about 90° which opens and partially erects the collapsed carton. On the inward stroke, the blade cam follower rides over a non-linear cam surface which is operative to rotate the blade in a direction opposite to the torsional biasing force. Near the inner end of the reciprocating stroke, the cam follower is repositioned on the linear cam surface with the blade again assuming a horizontal attitude and being withdrawn from the partially erected carton. The cycle is then repeated sequentially as each successive folded and collapsed carton is positioned adjacent the reciprocating blade.

3,606,824
PRESS AND CONVEYOR WITH SELF-STRIPPING DIE

Leonard F. Remington, Franklin, Mass., assignor to Thomson National Press Company, Franklin, Mass.

Filed May 2, 1969, Ser. No. 822,858
Int. Cl. B31b *1/14*
U.S. Cl. 93—58R **32 Claims**

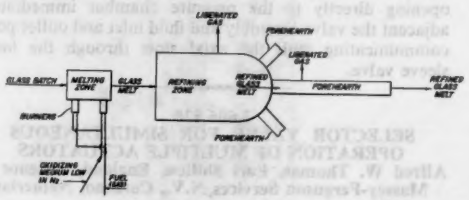


A cutting and creasing press having a frame supporting a cutting and creasing die and a platen for pressing a workpiece against the die. Means are provided for removing waste from the cutting and creasing die after the workpiece is removed from the cutting and creasing die to effectively separate waste from the workpiece. A conveyor system having a series of beaters provides a means for easily separating the die cut and creased workpieces from the waste material.

3,606,825
PROCESS OF MELTING GLASS

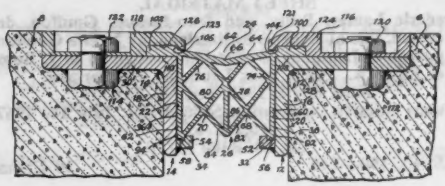
Andrew L. Johnson, New Castle, Pa., assignor to Glass Container Industry Research Corporation, New Castle, Pa.

Filed Dec. 24, 1969, Ser. No. 887,897
Int. Cl. C03b *5/16, 5/18*
U.S. Cl. 65—136 **5 Claims**



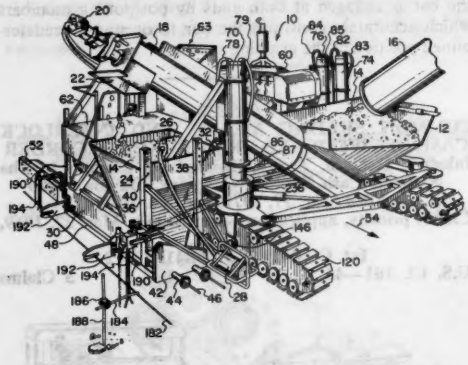
Melting of glass batch wherein the products of combustion of a gaseous fuel are introduced into the molten glass bath at a submerged level therein, with the gaseous fuel being combusted in an oxidizing medium low in nitrogen.

3,606,826
EXPANSION JOINT
Thomas C. Bowman, Buffalo, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.
Filed July 1, 1969, Ser. No. 838,138
Int. Cl. E01c 11/10
U.S. Cl. 94—18 10 Claims



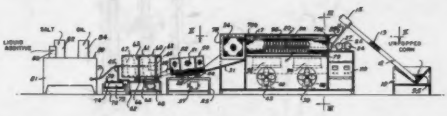
An expansion joint comprising a pair of spaced-apart structural means supporting at least one resilient sealing member therebetween. In one form the sealing member has laterally extending projections forming locking lugs at the upper transverse corners thereof received within slots formed in removable clamping means to hold the side walls of the sealing member against opposed faces of the structural means. In a modular arrangement an intermediate structural member is disposed between adjacent sealing members and a wear tread member is secured to such intermediate member and overlies adjacent sealing members.

3,606,827
CONCRETE CURB LAYING MACHINE
Charles P. Miller and Allen R. Miller, McHenry, and David J. Miller, Ringwood, Ill., assignors to Miller Formless Co., Inc., McHenry, Ill.
Filed Nov. 7, 1968, Ser. No. 774,014
Int. Cl. E01c 19/48
U.S. Cl. 94—46 20 Claims



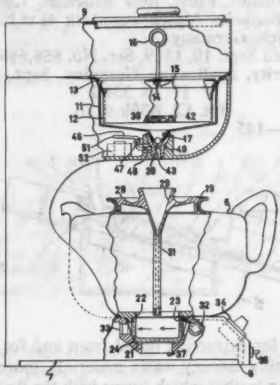
A self-propelled, self-steering and self-leveling machine for laying concrete characterized by accurate, automatic or manual, adjustment and constant control of direction, grade and forward or reverse motion. In one embodiment the machine includes independently controlled front and rear propulsion saddle-mounted means on each side of the main frame, control means operating from a guide line adapted to provide integrated double-acting steering of opposite pairs of the propulsion means and a hydraulic system including a pair of double-acting rams on one side of the machine, one supporting the main frame directly upon each saddle mount, and a single double-acting ram connected to a walking beam supported at its ends on the other saddle mounts on the opposite side of the machine providing a three-point leveling in a five point suspension. In another embodiment the hydraulic system is characterized by electro-hydraulic means to individually power both sides of the machine to maintain constant curve radius and including automatic valve means to connect an auxiliary power source into the system to meet the higher demand of the outer propulsion means for shorter curve radii. Manual control over-ride and forward speed control are also provided as well as steering over-run compensation adapted to meet only the steering potential need of the system and steer by integrals rather than hunting. Means are provided to move the steering sensor in the direction of steer to reduce or eliminate hunting and oversteer. The propulsion means for delivery of the concrete to the mule is independent of the levelling and steering systems providing for extremely fine proportioning of forward speed and rate of feed of concrete to the mule.

3,606,828
POPPING APPARATUS
Donald P. Smith, 4530 Woodfin Drive, Dallas, Tex. 75220
Continuation-in-part of application Ser. No. 516,838, Dec. 28, 1965. This application May 14, 1970, Ser. No. 37,136
Int. Cl. A23l 1/18
U.S. Cl. 99—238.5 8 Claims



Apparatus for continuously and positively conveying poppable material through a heating compartment wherein the material is popped and immediately removed from the heating compartment. A conveyor positively feeds the material through the heating compartment and baffles are employed in the heating compartment to regulate the temperature at specified locations throughout the length of the heating compartment. Air pressure is employed for immediately removing popped material from the popping apparatus.

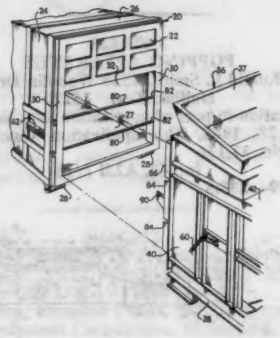
3,606,829
DRIP COFFEE MAKER
Melvin G. Alwood, 733 Butte St., Redding, Calif. 96001
Filed Apr. 10, 1969, Ser. No. 814,954
Int. Cl. A47j 31/10
U.S. Cl. 99—280 7 Claims



A beam of light is passed through a representative portion of the coffee in the pot of drip coffee maker and

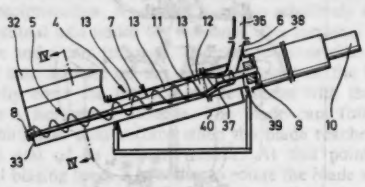
onto a photo-electric device. When the strength of the coffee reaches a predetermined level, as determined by the intensity of the light beam transmitted thereby and falling on the photo-electric device, a valve is closed preventing the passage of water from the grounds into the pot, thereby terminating the brewing process.

3,606,830
STATIONARY REFUSE PACKER AND ASSOCIATED CONTAINER APPARATUS
Donal W. Chaney, Galion, Ohio, assignor to Harsco Corporation, Harrisburg, Pa.
Filed Feb. 19, 1969, Ser. No. 800,656
Int. Cl. B30b *15/16*
U.S. Cl. 100—52 **10 Claims**



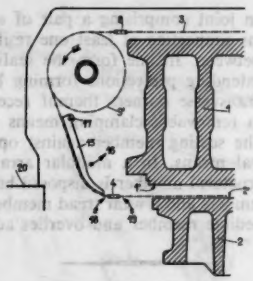
A stationary refuse packer and associated portable refuse container apparatus that comprises a novel automatic control system adapted for sophisticated control of the packer ram that loads the container. Such control includes jog type cycling wherein portions of the packer ram cycle can be precisely individually controlled; single cycling wherein the machine will go through one complete cycle and then stop; automatic cycling wherein the machine will cycle continuously until stopped; and timer cycling wherein the machine will continue to cycle until automatically stopped after a predetermined period of time. In addition, other aspects of control can be uniquely accomplished.

3,606,831
APPARATUS FOR EXTRACTING LIQUID FROM AND FOR CONVEYING LIQUID-CONTAINING TANNERY WASTE MATERIALS
Kasimir Hoffmann, Forst, near Bruchsal, Germany, assignor to Badische Maschinenfabrik G.m.b.H., Karlsruhe-Durlach, Germany
Filed Sept. 10, 1969, Ser. No. 856,696
Claims priority, application Germany, Sept. 12, 1968, P 17 85 338.2
Int. Cl. B30b *9/16*
U.S. Cl. 100—145 **2 Claims**



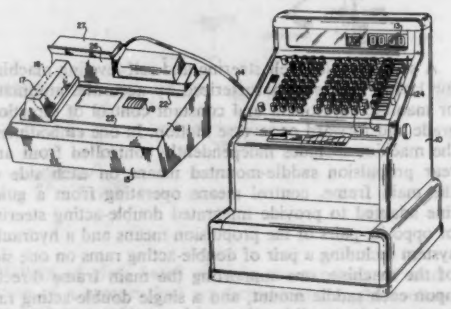
Apparatus for extracting liquid from and for conveying liquid containing tannery waste materials, more especially so-called scrap leather which forms with the fleshing of animal skins. The apparatus has a housing, inlet and outlet openings for the housing, a conveyor pipe connected to the outlet, a worm for receiving waste material at the inlet. The worm has a free volume which decreases from the inlet to the outlet between flights on the worm.

3,606,832
PLATEN PRESS FOR PROCESSING SHEET MATERIAL
Frederic Laufer, Prilly, and Jean-Jacques Gouffon, deceased, late of Renens, Switzerland, by Yvette Gouffon, guardian, Lausanne, Switzerland, assignors to J. Bobst et Fils S.A., Prilly, near Lausanne, Switzerland
Filed July 5, 1968, Ser. No. 742,779
Claims priority, application Switzerland, July 18, 1967, 10,298/67
Int. Cl. B30b *15/30*
U.S. Cl. 100—215 **10 Claims**



A platen press having beds with platen surfaces which are periodically opened and closed to operate on a sheet transported therebetween in a working position by gripping bars driven by an endless chain. The gripping bars engage the sheets at a gripping station and transport the sheets to the working position between the platen surfaces. A rail which holds the chain taut periodically moves in synchronism with the beds and slackens the chain when a bar reaches the gripping station whereupon the bar is engaged at both ends by positioning members which accurately constrain the bar to occupy a predetermined position at the gripping station.

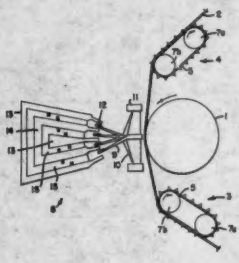
3,606,833
COMMON SETTING MEANS AND INTERLOCK CASH REGISTER AND CREDIT CARD RECORDER
Jakob J. Deutsch, Zurich, Switzerland, assignor to The National Cash Register Company, Dayton, Ohio
Filed Mar. 17, 1970, Ser. No. 20,236
Claims priority, application Great Britain, Mar. 27, 1969, 16,082/69
Int. Cl. B41j *29/64*; B41l *39/12*
U.S. Cl. 101—45 **5 Claims**



A data-recording system in which an amount set up in a cash register is automatically set up on the type

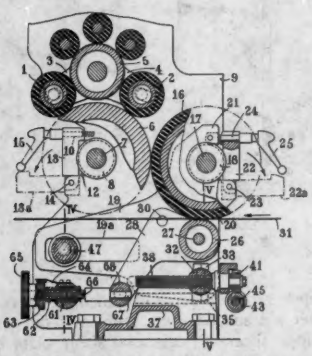
wheels of a credit card recorder for printing on sales slips together with an imprint from a credit card inserted in the recorder. The cash register is automatically disabled from further operation until a recording operation of the credit card recorder occurs and is completed.

3,606,834
PRINTER HAVING A PERMANENT MAGNET HAMMER MECHANISM
Alexander Nyman, Dover, and Robert H. Curtiss, Wayland, Mass., assignors to Mohawk Data Sciences Corporation, Herkimer, N.Y.
Filed June 24, 1969, Ser. No. 836,053
Int. Cl. B41j *5/00*
U.S. Cl. 101—93 9 Claims



A printer having a hammer mechanism containing hammers which are selectively and electrodynamically activated upon selective energization of activating coils attached to the hammers. Each activating coil is located between a pair of pole pieces of opposite polarities which abut the opposite poles of a thin peranent ceramic magnet magnetized through its thin dimension. The magnets are U-shaped as are those pole pieces abutting the outside surfaces of the magnets. Each hammer comprises an activating and a pellet portion disposed at an angle to each other and supported within the hammer mechanism by a U-shaped spring. Each leg of the U-shaped spring supports and is located perpendicular to one portion of the hammer.

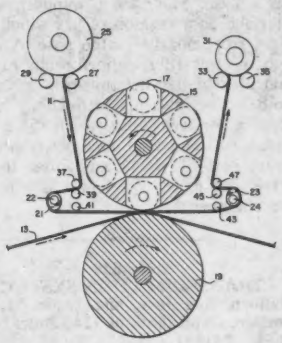
3,606,835
OFFSET ROTARY PRINTING MACHINE
Louis Jean Chambon, Paris, France, assignor to Société d'Etudes de Machines Speciales, Paris, France
Filed July 10, 1969, Ser. No. 840,719
Int. Cl. B41f *13/34*
U.S. Cl. 101—218 9 Claims



An offset rotary press wherein the printing and impression cylinders are carried by a pair of vertical flanges mounted for longitudinal and horizontal sliding movement on said frame structure, so as to bring said printing cylinder in contact with the plate cylinder by causing said pair of flanges to slide horizontally. Means are provided for converting the horizontal sliding movement of said pair of flanges into a vertical movement of said impression cylinder so to constantly bring said impression cylinder into engagement with the lower portion of said printing cylinder when said printing cylinder itself is in engagement with the plate cylinder.

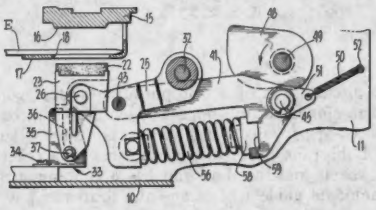
The size change operation can be carried out very rapidly since putting said printing cylinder and plate cylinder in mutual contact by causing the horizontal sliding movement of said pair of flanges will automatically cause said impression cylinder to be properly set in position against said printing cylinder, irrespective of the size contemplated.

3,606,836
ROTARY RIBBON SHUTTLE
Richard Colwill, Victor, N.Y., assignor to Burroughs Corporation, Detroit, Mich.
Filed Apr. 3, 1969, Ser. No. 813,101
Int. Cl. B41f *31/00*
U.S. Cl. 101—244 7 Claims



An ink transfer ribbon advancing mechanism for a high speed rotary printing press including a pair of eccentric rollers one on each side of the rolling bight of the press in frictional contact with the ribbon for alternately accelerating and decelerating the velocity of the ribbon through the bight.

3,606,837
BED AND PLATEN PRINTER WITH SPRING BIASED PLATEN CONTROL LEVER
Helmut K. Waibel, Vista, N.Y., assignor to The Singer Company, New York, N.Y.
Filed Nov. 3, 1969, Ser. No. 873,241
Int. Cl. B41f *1/06*
U.S. Cl. 101—316 2 Claims



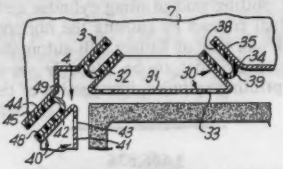
A device for controlling the operation of a planar platen in a printing machine and more particularly for reducing the operating load requirement for the pressure printing of a stuffed envelope, or the like, regardless of its thickness.

3,606,838

LOAD-SUPPORTING APPARATUS

Kenneth Vincent Blanchard, Southampton, England, assignor to Hovercraft Development Limited, London, England

Filed Apr. 23, 1968, Ser. No. 723,425
Int. Cl. B60v 1/16
U.S. Cl. 104—23FS 7 Claims



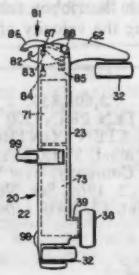
A load supporting apparatus, providing a suspension for example for a tracked air cushion vehicle, consists of a rigid cushion member with wall portions inwardly inclined from a base. The base is supported from a cooperating surface on a cushion of gas which is contained by jets of gas from nozzles in the base. A membrane is connected to the inwardly inclined walls of the cushion member and also to parallel inwardly inclined walls in a load member. The inwardly inclined walls of the load member form a concavity into which the cushion member can withdraw. The load member, cushion member and membrane partially define a chamber for pressurized gas, and the membrane presents a concave surface towards the chamber.

3,606,839

TRANSPORTATION SYSTEM

Neil S. Stafford, San Jose, and Justin M. Jacobs, Jr., San Francisco, Calif. (both of 1245 Jones St., San Francisco, Calif. 94109)

Filed July 23, 1968, Ser. No. 746,884
Int. Cl. B61b 3/00, 13/04
U.S. Cl. 104—119 10 Claims



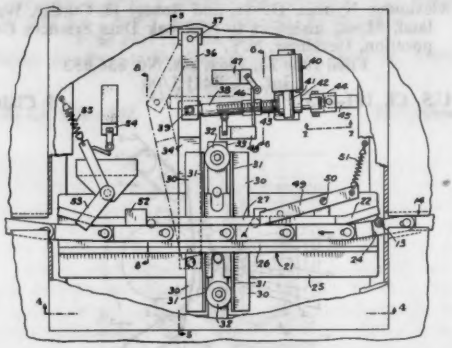
The disclosure is of a transportation system which includes an elongated rail support which carries three parallel spaced-apart rails which serve as running surfaces. Two of the rails have running surfaces to accommodate guide wheels and the third rail has a running surface to accommodate guide wheels and the third rail has a running surface to accommodate a main drive wheel of a powered rack member having wheels which move along the rails and which can carry various payloads. A switch section is provided for selectively directing rack members over a main route or for moving them onto an alternative route.

3,606,840

TOW TRUCK CONVEYOR SYSTEM

Karl R. M. Karlstrom, Roseville, Mich., assignor to American Chain & Cable Company, Inc., New York, N.Y.

Filed Jan. 31, 1969, Ser. No. 795,589
Int. Cl. B65g 17/42
U.S. Cl. 104—172 15 Claims



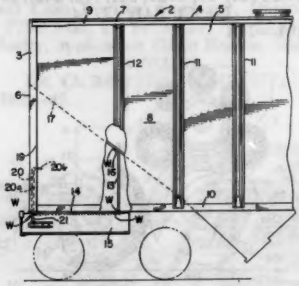
A tow truck conveyor system comprising a plurality of tow trucks movable along a floor having a slot therein. A conveyor is driven within the floor beneath the slot and has driving means thereon for engaging a tow pin on the tow truck to move the tow truck along. A track is provided for the conveyor and a portion of the track is adapted to be moved laterally to cause the tow pin to engage a cam portion for camming the tow pin upwardly and out of engagement with the driving means on the conveyor.

3,606,841

COVERED HOPPER CAR END CONSTRUCTION

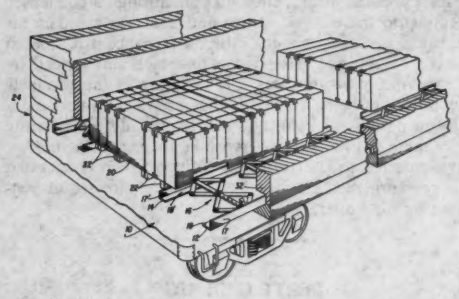
Kent N. Johnson, South Holland, John H. Spence, Chicago Heights, and William Van der Sluys, Homewood, Ill., assignors to Pullman Incorporated, Chicago, Ill.

Filed Dec. 30, 1968, Ser. No. 787,924
Int. Cl. B61d 5/00, 7/00, 17/06
U.S. Cl. 105—248 24 Claims



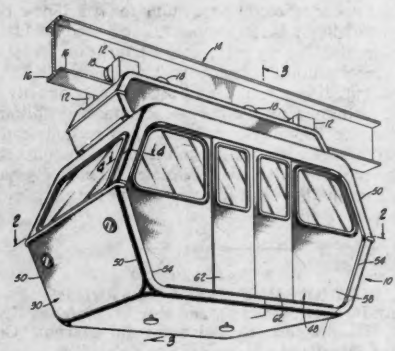
A hopper railroad car end construction comprising a stub center sill spaced away from and outwardly of the hopper slope sheet, a horizontal shear plate beam being mounted on the stub sill, a transversely extending upright bolster web beam welded on the shear plate beam and joining with the slope sheet, and a lower end beam structure welded in upright position on the outer end of the shear plate beam and with the side portions of the car.

3,606,842
ADJUSTABLE RETAINER
Basil George Verbick, 7121 Arizona Ave., Hammond, Ind. 46323
Filed May 5, 1969, Ser. No. 821,633
Int. Cl. B61d *45/00*
U.S. Cl. 105—369B 7 Claims



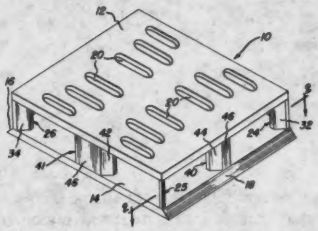
An adjustable retainer for inhibiting the lateral movement of freight within a freight carrying vehicle which comprises a pair of bracing members having adjustable means interposed therebetween. The adjustable means comprises a plurality of linkages pivotally coupled together to form a pair of parallelograms. Fixing members having a plurality of notches are pivotally coupled to the linkages and are suitable for engaging a bolt about which each of said parallelograms is expandable and contractable. One of said pair of bracing members is affixed to the freight carrying vehicle while the other of said pair of bracing members is expandable to abut the outer leg of a skid carrying the load. An adjustable retainer on each side of the load is necessary to adequately restrain lateral movement of the load.

3,606,843
RAIL CAR BODY CONSTRUCTION
George J. Adams, Santa Monica, and Harry I. Warner, West Covina, Calif., assignors to Stanray Corporation, Chicago, Ill.
Filed July 30, 1969, Ser. No. 846,179
Int. Cl. B61d *17/00, 19/02*
U.S. Cl. 105—397 3 Claims



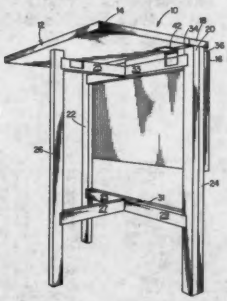
A rail car body having an outer shell formed to provide peripheral rims projecting laterally outwardly from the perimeters of the sides thereof so that the side walls of the car body are, in effect, recessed laterally inwardly relative to the peripheral rims. One of the side walls is provided with a central doorway therein, and two sliding doors, movable horizontally in the fore-and-aft direction between open and closed positions, are disposed within the lateral confines of the recess formed by the corresponding side wall and the peripheral rim encompassing it.

3,606,844
PALLET HAVING GUIDING MEANS IN ALL SIDES
John William Lubker II, and Leo Earnest Owen, Seymour, Ind., assignors to Standard Oil Company, Chicago, Ill.
Filed Oct. 30, 1969, Ser. No. 872,510
Int. Cl. B65d *19/18*
U.S. Cl. 108—58 9 Claims



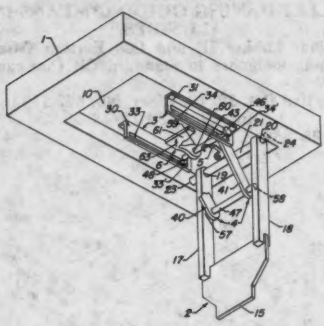
Disclosed is a pallet having top and bottom members connected together by means which space said members to accommodate between them lifting means. The connecting means include upright support elements, near the perimeter of the pallet, which are spaced from each other to define in all sides of the pallet entryways that admit the lifting means. These entryways are characterized by having sidewalls which intersect the perimeter of the pallet to define between each sidewall and the perimeter an acute angle ranging between about 30° and about 75° The sidewalls guide the lifting means.

3,606,845
FOLDING TABLE
Franklin J. Hickman, 49 Offatt Road, Bedford, Mass. 01730
Filed Apr. 21, 1969, Ser. No. 817,631
Int. Cl. A47b *3/00*
U.S. Cl. 108—112 2 Claims



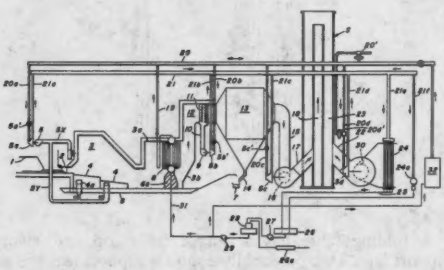
A folding table has a hinged table top and pivoted support legs. Two diagonally opposite support legs are pivotable to a stowed position adjacent the other support legs that are relatively fixed. The table top has two portions that pivot downwardly into a stowed position adjacent the support legs so as to complete a package that is no more than four times as thick as any one of the legs.

3,606,846
STOWABLE TABLE AND BASE
John Andrews, New Preston, and Lewis Edgar Clack, Torrington, Conn., assignors to Univeral Oil Products Company, Des Plaines, Ill.
Filed Dec. 11, 1969, Ser. No. 884,165
Int. Cl. A47b 3/08
U.S. Cl. 108—132 5 Claims



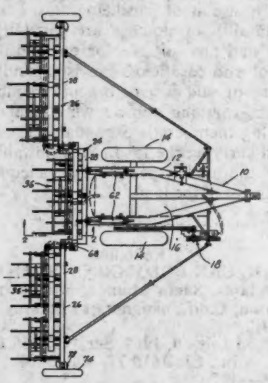
A stowable table having a platform with a leg support member that rotates into a recessed region of the platform for storage purposes. When in use, the leg support member is maintained in an extended position by a brace which is rotatably connected to the support member and which is maintained in a guide located within the recessed region by a spring. A cam-type release mechanism may be activated to remove the brace from the bias of the spring and allow the brace to be moved within the guide, which in turn causes the leg support member to be rotated into the recessed region. A removable form of pedestal base is provided to support the stowable table and is adapted for mounting between a pair of seats. The base includes a support post having an upper end portion with receptacle means for receiving the leg support member of the table and, in addition, has projecting members from the support post that are sized to engage and clamp onto the under framing of the adjacent seats.

3,606,847
REFUSE INCINERATOR PLANT DESIGN AND METHOD OF OPERATING SUCH A PLANT
Bertram B. Reilly, 17 Briar Cliff Road, Pittsburgh, Pa. 15202
Filed Sept. 8, 1969, Ser. No. 855,926
Int. Cl. F23g 5/00
U.S. Cl. 110—10 8 Claims



There is disclosed a municipal incinerator plant in which a high pressure steam boiler is so arranged that hot combustion gases from the incinerator are cooled by passage therethrough to a temperature compatible with the construction materials of dust collecting and blower equipment through which the combustion gases flow to a stack. Such gases are thereby cooled and cleaned without water sprays and the steam so generated is in part converted into mechanical energy for operation of some components of the incinerator system. The incinerator stack has concentric inner and outer flues, and the hot combustion gases are discharged into the inner flue. A blower, operated by the high pressure steam, circulates air through a condenser to condense the exhaust steam and heat the air. The air so heated is discharged into the outer concentric flue so that the combustion gases leave the stack surrounded by an envelope of rising clean air, resulting in the products of combustion being carried higher above the stack, especially in periods of calm air, before they diffuse into the atmosphere than would otherwise be the case. The blower above referred to is driven by a turbine which is operated as a pressure regulator for the high pressure steam generated by the boiler.

3,606,848
FERTILIZER RIG
Charley B. Dobbs, 515 E. Dayton Ave., and Arlie R. Fullerton, R.F.D. 3, Box 25, both of Dayton, Wash. 99328
Filed Dec. 20, 1968, Ser. No. 785,499
Int. Cl. A01b 49/00, 21/02; A01c 23/02
U.S. Cl. 111—7 4 Claims

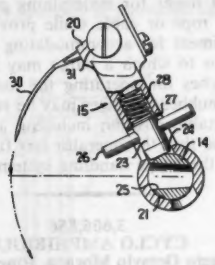


A liquid-fertilizer-injecting rig having tubular, fertilizer-injecting tines for directly penetrating the soil. These tines are individually resiliently mounted for accommodating uneven terrain. The rig preferably comprises a trailer device having a plurality of sections including a middle section and two side sections, with one section directly behind the fertilizer tank and the side sections being disposed on either side thereof, so that the three sections can be pulled abreast of each other with means for disconnecting the side sections so they can be rotated 90 degrees and be disposed behind the central section when the rig is pulled along a narrow road.

3,606,849
THROW-OUT NEEDLE CARRIER
Anthony D. Forte, Chicago, and Roy W. Fletcher, Riverdale, Ill., assignors to Union Special Machine Company, Chicago, Ill.
Filed July 3, 1969, Ser. No. 838,803
Int. Cl. D05b 1/24
U.S. Cl. 112—176 10 Claims

This disclosure relates to an improvement in a blind-stitch sewing machine having a needle carrier mounted on an oscillatory shaft. The improvement comprises

means whereby the needle carrier may be disengaged from the shaft and rotated relative thereto thereby permitting easy access to a needle carried by the needle carrier for threading purposes and also for needle maintenance.

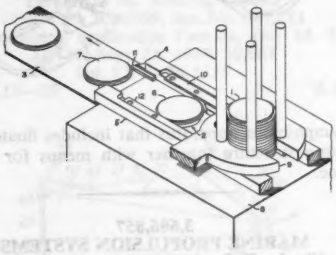


3,606,850

SELF-ADJUSTING CUTOFF KNIFE

Raymond E. Price, 64 Hoitt Road, Belmont, Mass. 02178; Clifford F. Tirrell, 2 MacDougall Court, South Weymouth, Mass. 02190; Richard C. Adams, 36 Woodchester Circle, Waltham, Mass. 02154; and Robert W. George, Strawberry Lane, Belle Mead, N.J. 08502

Filed Apr. 3, 1969, Ser. No. 813,039
Int. Cl. B21d *43/00*; B65g *59/06*; B65h *3/32*
U.S. Cl. 113—114BE 4 Claims



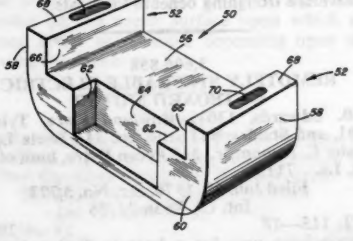
A pair of cutoff knives for stripping the lower closure of a vertical stack of closures is floated on spring shims to be able to ride between the curl portions of closures one of whose curl is so oversized as to otherwise cause the knives to interfere with the curl portion.

3,606,851

STABILIZER WITH UPRIGHT END TANKS

Frans V. A. Pangalila, Matawan Township, and John P. Martin, Upper Montclair, N.J., assignors to Flame Stabilization Systems, Inc., Hoboken, N.J.

Filed May 28, 1969, Ser. No. 828,609
Int. Cl. B63b *43/06*
U.S. Cl. 114—125 6 Claims



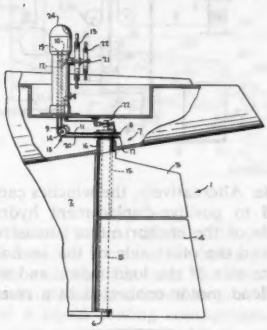
A tank for stabilizing a ship against roll, the tank comprising a main body portion with a pair of communicating upright end tanks appended thereto. The stabilizing tank is partially filled with a liquid so that the surface of the liquid, when the tank is level, lies below the top of the central region of the tank.

3,606,852

RUDDER

Thomas Cafiero, Stoneleigh Road, Scarsdale, N.Y. 10583

Filed Jan. 27, 1970, Ser. No. 6,142
Int. Cl. B63h *25/06*
U.S. Cl. 114—163 2 Claims



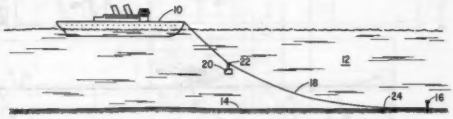
A rudder system is provided wherein the rudder is comprised of an upper and lower section each of which may be operated individually or in concert with each other.

3,606,853

SYSTEM FOR REDUCING DYNAMIC TENSION IN ANCHOR LINE

Feng H. Hsu, Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.

Filed Apr. 1, 1969, Ser. No. 811,850
Int. Cl. B63b *21/24*
U.S. Cl. 114—206 6 Claims



This is a system for reducing the dynamic tension in an anchor line connecting a floating vessel to an anchor. A weight clump is connected to the anchor line. The clump must be (1) within critical weight limits and (2) located properly; otherwise dynamic tension can be increased instead of decreased. The weight of the clump should be between about 1½ and about three times the weight per unit length of anchor line times the depth of the body of water. The weight clump should be located from the ship a distance of about at least ⅓ (about not over about ½) of the free-hanging length of the anchor line.

3,606,854

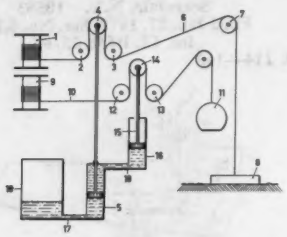
APPARATUS FOR SYNCHRONIZING MOVEMENTS IN ANCHOR CABLE AND A LOAD CABLE

Peter Johan van Lunteren, Kinderdijk, Netherlands, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands

Filed Aug. 11, 1969, Ser. No. 848,793
Claims priority, application Netherlands, Aug. 12, 1968, 6811457
Int. Cl. B63b *21/24*
U.S. Cl. 114—206R 5 Claims

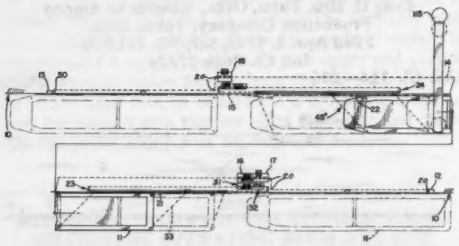
Vessel with an anchor whose cable is driven by a first winch and another load such as a diving bell whose cable

is driven by a second winch, has a swell compensator for each of the two cables, the compensators being interconnected to prevent movement of the load relative to the anchor. The two swell compensators are coupled hydraulically. That of the anchor cable can comprise a hydraulic cylinder connected to a pressure vessel on one side and to a hydraulic cylinder of the compensator for the load on



the other side. Alternatively, the winches can be individually coupled to positive-displacement hydraulic motors with one side of the anchor motor connected to a pressure vessel and the other side of the anchor motor connected to one side of the load motor and with the other side of the load motor connected to a reservoir for hydraulic fluid.

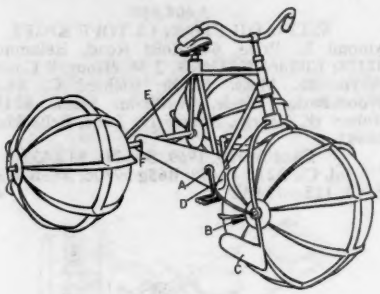
3,606,855
BARGE HANDLING SYSTEM
Wallace J. Saxonmeyer, Park Forest, Ill., assignor to Whiting Corporation
Filed July 22, 1969, Ser. No. 843,492
Int. Cl. B63b *21/00*
U.S. Cl. 114—230 **6 Claims**



An automatic, remotely controlled barge handling system for installation on a barge loading dock which includes a main haul barge puller apparatus and barge snubber apparatus. The puller apparatus includes: a main haul rope; sheave means for supporting and guiding the rope so that one run thereof extends along the front edge of the dock; spaced hawsers clamped to the run with eyes on the outer ends thereof for attachment to a barge; and, a powered winch, preferably of the fluid drive reversible type, for driving the rope and pulling a barge connected thereto along the dock. The barge snubber apparatus has track means adapted to be installed along the front edge of the dock in the loading area thereof with fore and aft snubber carriages mounted on the track means for running therealong. A cable or rope is connected with each of the carriages and sheaves are provided for supporting and guiding each such cable. A reversible powered winch is provided for operating or moving each snubber carriage over which the cable connected to the associated carriage runs so that the same may be moved in opposite directions along the track. A hawser is attached to each of the snubber carriages for connection to a barge cleat or the like.

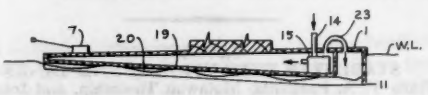
The main haul rope and each of the cables connected to the snubber carriages, each runs through a tension counterweight tower for maintaining predetermined tension on each rope or cable while providing pay-out and take-up movement for accommodating surge, storm, and tide conditions to which a barge may be subjected. The powered winches for operating the main haul rope and each of the snubber carriages may be remotely controlled from any suitable position including an overhead barge loading cab so that the operator has full and convenient control over the barge handling system.

3,606,856
CYCLO AMPHIBIOUS
Ernesto Octavio Moraga, Rincon 1239, Buenos Aires, Argentina
Filed Jan. 8, 1969, Ser. No. 797,318
Int. Cl. B63f *3/00*; B63h *1/38*
U.S. Cl. 115—1 **1 Claim**



An amphibious apparatus that includes floaters, and a supporting structure together with means for operating the same.

3,606,857
MARINE PROPULSION SYSTEMS
Charles T. Sundquist, 12566 SE. 53rd St., Bellevue, Wash. 98004
Filed June 17, 1968, Ser. No. 737,591
Int. Cl. B63h *11/00, 1/34*
U.S. Cl. 115—11 **1 Claim**

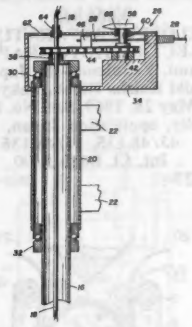


This invention is an improvement in marine propulsion. It consists of two floats separated by open water and joined by interconnecting structure. The floats are propelled by pressurized gases flowing expansively within inclined inverted troughing beneath the floats.

3,606,858
REMOTELY STEERABLE ELECTRIC OUTBOARD MOTOR
Neal B. Edwards, 130½ Rowland Place, Tyler, Tex. 75701, and Stanley B. Lucas, Sr., 115 Lucia Lane, and Chester C. Semon, Jr., 315 Pecan Drive, both of Shreveport, La. 71106
Filed Jan. 19, 1970, Ser. No. 3,772
Int. Cl. B63h *21/26*
U.S. Cl. 115—18 **10 Claims**

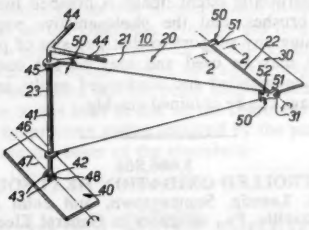
A propulsion unit for a boat is disclosed which includes a submersible electric propulsion unit connected to a vertically disposed tubular shaft which is rotatably

journaled in a support that is attachable to a boat. A first chain sprocket is connected to the end of the shaft and a second chain sporcket is journaled on the support.



A push-pull cable is attached to one reach of an endless chain that is coupled around the sprockets. The cable is reciprocated by a remotely located actuating unit.

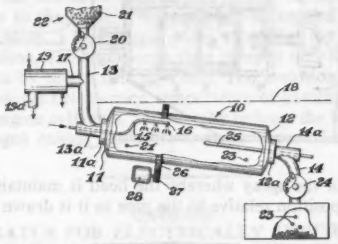
3,606,859
AQUATIC VEHICLE
Michael D. Skitsko, 9650 79th St., Edmonton 82, Alberta, Canada
Filed June 27, 1969, Ser. No. 837,011
Claims priority, application Canada, July 10, 1968, 24,755; Sept. 23, 1968, 30,661
Int. Cl. B63h *1/30*
U.S. Cl. 115—29 **6 Claims**



An amusement and exercising device including a body buoyant in water and so shaped as to propel itself forwardly upon rocking the body to and fro in the water. The body is preferably in the shape of an irregular tetrahedron having a narrow vertical edge providing a bow and a horizontal narrow edge at the opposite end providing a stern and with sculling devices consisting of flat board-like members pivotally attached to the body for limited arcuate movement. Directional control may be effected by a rudder pivotally mounted on the body and/or pivoting one of the sculling devices about a vertical axis. Toe grips are provided on the upper surface upon which an occupant may either sit or stand depending upon skill in manipulating the device.

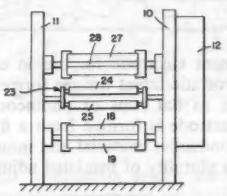
3,606,860
CONTINUOUS TABLET COATING APPARATUS
James L. Dunn, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed Oct. 6, 1969, Ser. No. 864,001
Int. Cl. B05c *5/00, 11/115*
U.S. Cl. 118—61 **4 Claims**

A continuous tablet coating apparatus being a generally kiln-like container rotatable about its longitudinal axis having one end elevated above the other, the elevated end being the inlet to the container and the depressed end being the outlet from the container, each inlet and outlet provided with a gas-tight seal and a valved tube or pipe to conduct solids into and away from the kiln-like container. The inlet tube or pipe has a side arm tube connected to a condenser which is preferably located at least above the



plane of the elevated end of the kiln-like container. The kiln-like container has a means for heating the interior, particularly the solids which enter the container, and a liquid distribution means positioned to provide a uniform distribution of a liquid coating composition onto solids within the container. Associated with the container are means to rotate the container.

3,606,861
CONTINUOUS ROLL COATER
Edwin K. Schaeuble, Green Bay, Wis., assignor to Paper Converting Machine Company, Inc., Green Bay, Wis.
Filed June 19, 1969, Ser. No. 834,749
Int. Cl. B05c *1/00*
U.S. Cl. 118—224 **2 Claims**

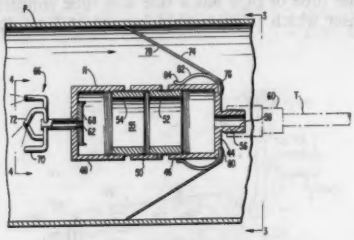


A roll coater of the gravure or related fluid applying type which employs turret equipped with backing rolls to eliminate the machine stoppages usually required during normal operation.

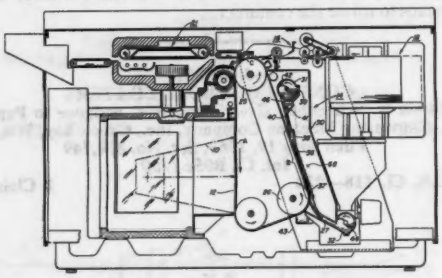
3,606,862
PIPE LINING APPARATUS
Milton P. Huff, P.O. Box 95, Deweyville, Tex. 77614; Sidney J. Sullivan, Jr., 439 1st St., Jennings, La. 70546; and Wayne E. Bailey, 155 Hullitt Drive, Vidor, Tex. 77662
Filed Apr. 22, 1969, Ser. No. 818,286
Int. Cl. B05c *7/02*
U.S. Cl. 118—306 **6 Claims**

Disclosed is a motor driven drum for drawing a supply hose and an applicator head through a pipe. The hose communicates through the drum with a reservoir containing coating material and supplies the latter to the applicator head for coating the wall of a pipe. The applicator head has a plurality of nozzles mounted for rotation under centrifugal force to provide a conical spray for applying the coating to the wall as the head is drawn

through the pipe. A plurality of centering vanes are carried at circumferentially spaced positions about the head and are spring biased to engage the inner wall forwardly of the spray whereby the head is maintained in a coaxial position relative to the pipe as it is drawn through the latter.

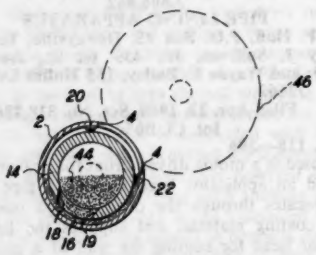


3,606,863
DEVELOPMENT ELECTRODE
Salvatore Latone, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Filed Feb. 12, 1969, Ser. No. 798,669
Int. Cl. B05b *5/00*
U.S. Cl. 118—637 **3 Claims**



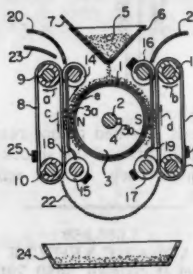
A development electrode for use in cascade development of electrostatic latent images formed on flat photoreceptors such as flat runs of photoconductor belts or plates. The electrode is formed from a flat plate of glass coated with conductive material and mounted in position by means of a plurality of insulated adjustable devices.

3,606,864
DONOR ASSEMBLY
William D. Perun, Webster, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Filed Mar. 10, 1969, Ser. No. 805,767
Int. Cl. G03g *13/00*
U.S. Cl. 118—637 **11 Claims**



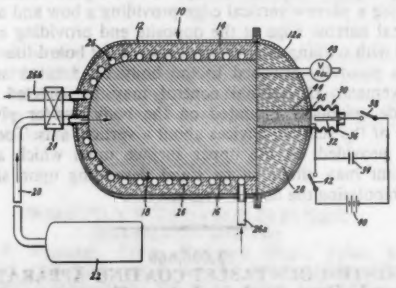
An electroscopic marking particle supply and donor assembly having a cylindrical housing with an opening therein to make accessible to another member a crescentic tubular member enclosing a supply of developer material and which reciprocates inside the housing and about the axis thereof.

3,606,865
DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY
Yutaka Koizumi, Yokohama-shi, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan
Filed May 28, 1969, Ser. No. 828,582
Claims priority, application Japan, June 8, 1968, 43/48,135, 43/48,136
Int. Cl. B05b *5/00*
U.S. Cl. 118—637 **6 Claims**



There is disclosed herein a developing apparatus, wherein magnetic brushes are formed on the outer surface of a rotating cylinder corresponding to the poles of a magnet installed within the rotating cylinder, the photosensitive surface of a sheet of photosensitive paper bearing an electrostatic latent image is brushed twice by the magnetic brushes, and the photosensitive paper is fed without using any support so that any size of photosensitive paper may be used and may be fed continuously, toner can be supplied and discharged easily, and a good quality image can be obtained quickly.

3,606,866
CONTROLLED OXIDATION HEAT SOURCE
Rudolf R. Laessig, Sumneytown, and John J. Maley, Schwenksville, Pa., assignors to General Electric Company
Filed May 1, 1969, Ser. No. 820,871
Int. Cl. F22b *1/00*; F23b *7/00*
U.S. Cl. 122—4 **11 Claims**



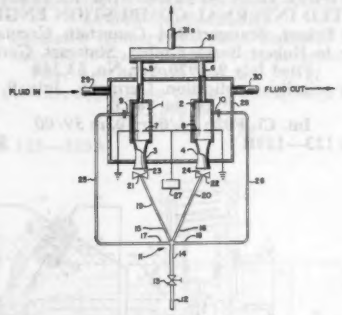
Apparatus for generating heat by oxidation of a metal. The apparatus is comprised of a quantity of oxidizable metal located within a container, a supply of oxygen controllably ducted to the metal, means for initiating the oxidation of the metal and a heat exchanger for conducting the heat generated by the oxidation of the metal to the area to be heated.

3,606,867

PULSATING COMBUSTION SYSTEM

Francis E. J. Briffa, Sunningdale, England, assignor to Shell Oil Company, New York, N.Y.

Filed Mar. 5, 1970, Ser. No. 16,799
Claims priority, application Great Britain, Feb. 17, 1969, 8,442/69
Int. Cl. F23r 1/12
U.S. Cl. 122—24 3 Claims



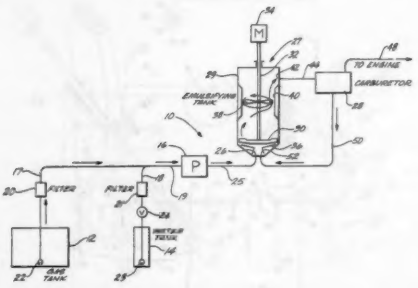
A pulsating combustion system for producing a high temperature, high pressure gas stream including at least a pair of combustion chambers with each of the chambers having at least one inlet for introducing a mixture of gas and oxidant thereto and at least one combustion gas outlet. Ignition means are associated with the interior of each of the chambers for igniting the mixture of gas and oxidant present in the chambers and pulse take-off means are coupled to each of the chamber means for taking pressure pulses due to combustion in the chambers from each of the chambers. Finally, gas feed means are coupled to each of the inlets for selectively supplying gas thereto with switching means operatively engaging both the gas feed means and the pulse take-off means for supplying gas to the inlet of one of the chambers upon actuation of the pressure pulses received by the pulse take-off means from the other of the chambers.

3,606,868

SMOG CONTROL SYSTEM EMPLOYING AN EMULSION OF WATER IN GASOLINE

Maarten Voogd, 918 Palomar Road, Ojai, Calif. 93023

Filed May 14, 1970, Ser. No. 37,117
Int. Cl. F02d 19/00; C10l 1/32; F02m 25/02
U.S. Cl. 123—25R 5 Claims



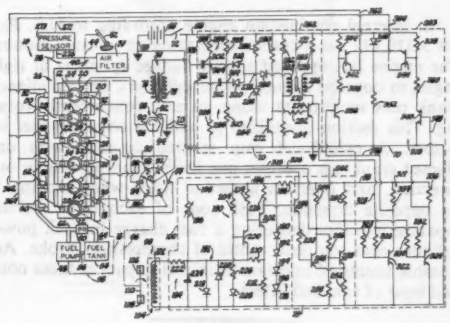
A fuel system for reducing nitrogen oxides and carbon monoxide in the exhaust gas emissions of an internal combustion engine includes a storage tank for gasoline and a dissolved emulsifying agent, a storage tank for deionized water, and means for pumping controlled volumes of the gasoline and emulsifying agent and the water to an emulsifying chamber and thence to the engine. In one form of the invention, rotary stirring means within the emulsifying chamber emulsify the water in gasoline, and the emulsion is then introduced into the engine carburetor. Means provides for continuous, uninterrupted recirculation of a portion of the emulsion accumulated in the carburetor fuel chamber to the emulsifying chamber. In another form of the invention, a centrifugal pump emulsifies the water in the gasoline. The emulsion is then pumped into the engine cylinders by direct fuel injection. The emulsion substantially reduces the reaction temperature of gasoline and air in the engine cylinders, and thereby reduces the formation of nitrogen oxides which are a major cause of air pollution.

3,606,869

APPARATUS FOR ELECTRICALLY SYNCHRONIZING FUEL INJECTION WITH FUEL IGNITION IN AN INTERNAL COMBUSTION ENGINE

Gerald O. Huntzinger and Donald O. Ruff, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

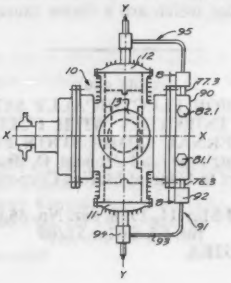
Filed May 11, 1970, Ser. No. 36,055
Int. Cl. F02m 51/00
U.S. Cl. 123—32EA 8 Claims



In an internal combustion engine having a plurality of cylinders arranged in first and second banks, an electronic fuel injection system includes a timing apparatus for synchronizing the injection order of the cylinders with the ignition order of the cylinders. The timing apparatus comprises a timing transducer and a timing circuit. The timing transducer includes a pair of rotatable permanent magnets oppositely poled with respect to a stationary winding for producing alternate first and second timing pulse pairs in synchronization with the operating cycles of the engine. The first and second timing pulse pairs exhibit opposite polarity transitions effectively dividing each engine operating cycle into first and second operating stages. The timing circuit includes a bistable multivibrator for producing a timing signal which alternately shifts between first and second levels in response to the opposite polarity transitions in the first and second timing pulse pairs. In a conventional manner, a fuel ignition system sequentially fires the first bank of cylinders during the first operating stage and sequentially fires the second bank of cylinders during the second operating stage. In a complementary manner, the fuel injection system is responsive to the first and second levels of the timing signal to simultaneously charge the first bank of cylinders during the first operating stage and to simultaneously charge the second bank of

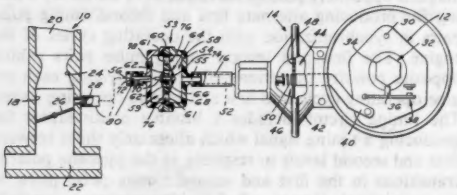
cylinders during the second operating stage. Thus, the injection order of the cylinders is time division synchronized with the ignition order of the cylinders.

3,606,870
INTERNAL COMBUSTION ENGINE FUEL INJECTION ACTIVATION MEANS
Leopold W. Llewellyn, 4740 Southlawn, Burnaby, British Columbia, Canada
Filed Oct. 21, 1969, Ser. No. 868,197
Claims priority, application Great Britain, Oct. 26, 1968, 50,904/68
Int. Cl. F02b *75/24*
U.S. Cl. 123—56B **9 Claims**



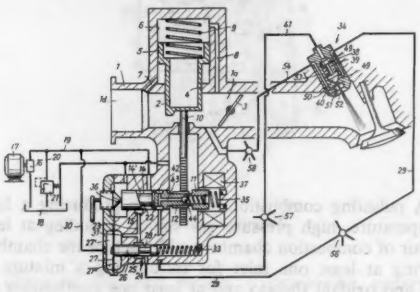
An internal combustion engine according to U.S. Patent 3,329,132 has a crankshaft having an unusual motion. The engine has opposed aligned charge cylinders at right angles to opposed aligned power cylinders. Spaced aligned crank pins reciprocate along an axis concurrently rotating. This motion is utilized to activate common fuel injectors. A cylindrical cam secured co-axial with one aligned crank pin operates one lifter when moving in one direction, and operates a second lifter when moving in an opposite direction. Push rods of each lifter activate separate injectors delivering a fuel charge to each power cylinder near top dead centre of compression stroke. Adjustable timing of injection. Minimal impact reduces noise and wear of cam and lifters.

3,606,871
ENGINE SPARK TIMING CONTROL DEVICE
Karl H. Gropp, Grosse Pointe Woods, and John A. Lewis, Detroit, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed July 6, 1970, Ser. No. 52,325
Int. Cl. F02p *5/06*
U.S. Cl. 123—117A **4 Claims**



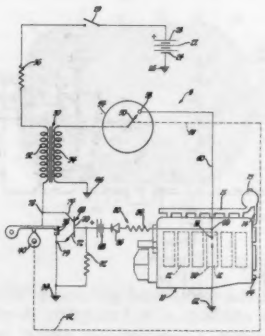
An internal combustion engine has a vacuum servo connected to the distributor breaker plate for moving it as a function of the change in carburetor spark port vacuum as controlled by a mechanical device between the servo and spark port having sintered metal flow restriction and a one-way check valve in parallel flow circuits, the check valve unseating during rapid vehicle accelerations to quickly reduce the spark advance setting to a lower level, for better performance, the sintered metal flow restriction providing a delayed rate of return to an advanced spark timing setting during relatively slower accelerations, to minimize the emission of undesirable exhaust gas elements.

3,606,872
FUEL INJECTION SYSTEM FOR EXTERNALLY IGNITED INTERNAL COMBUSTION ENGINES
Konrad Eckert, Stuttgart-Bad Cannstatt, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany
Filed July 9, 1970, Ser. No. 53,344
Claims priority, application Germany, July 9, 1969, P 19 34 705.8
Int. Cl. F02b *33/00*; F02m *39/00*
U.S. Cl. 123—119R **5 Claims**



In a fuel injection system, the fuel admitted to the fuel injection valve is metered by a plunger angularly displaceable by a throttle member responsive to the air pressure in the suction tube. Prior to the injection of fuel by the injection valve into the suction tube, the fuel is premixed in said injection valve by air taken from the suction tube downstream of said throttle member and upstream of an arbitrarily operable butterfly valve.

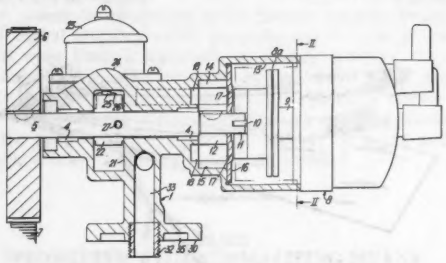
3,606,873
IGNITING SYSTEM FOR DIESEL ENGINE STARTING
Gustav F. Rademacher and Donald R. Van Uum, Davison, Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed May 1, 1970, Ser. No. 33,638
Int. Cl. F02b *3/00*; F02n *17/00*; F02p *1/00*
U.S. Cl. 123—179B6 **2 Claims**



An igniting system is provided in a diesel engine wherein a spark ignition circuit including a spark plug mounted

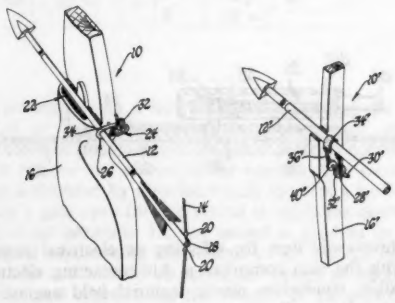
in one of the engine combustion chambers assists starting by spark ignition. After normal compression ignition is established, the ignition circuit is deactivated by a semiconductor switch. The semiconductor switch is controlled in response to ionization of combustion chamber gases which normally occurs as the engine is running.

3,606,874
INTERNAL COMBUSTION ENGINE ACCESSORY UNITS ASSEMBLIES
Donald Frederick Gregory, Leighton Buzzard, England, assignor to General Motors Corporation
Filed Apr. 30, 1970, Ser. No. 33,311
Claims priority, application Great Britain, May 10, 1969, 23,899/69
Int. Cl. F02b *77/14*
U.S. Cl. 123—195A **3 Claims**



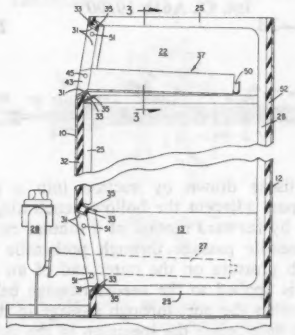
Accessory units for an internal combustion engine are mounted on a housing adapted to be detachably secured to the engine, the housing carrying a single drive shaft for the ignition distributor, an oil pump and a fuel pump, and the distributor and oil pump and a fuel pump actuator cam being arranged coaxially of the drive shaft which is adapted to be driven by a drive chain belt which drives the engine cam shaft.

3,606,875
ASSEMBLY FOR HOLDING AN ARROW IN A NOCKED OR FULLY DRAWN POSITION
Richard F. Carella, 35572 Strathcona, Mount Clemens, Mich. 48043
Filed Nov. 24, 1969, Ser. No. 879,494
Int. Cl. F41b *5/00*
U.S. Cl. 124—24 **15 Claims**



An archery assembly for holding an arrow in a fully drawn position or a nocked position on a bow string of a bow including a rod extending rearwardly from the bow and terminating in a shaft-like portion with a cantilevered upturned end. A first circular member is disposed about the rod and is retained thereon by a stop disposed about the rod to prevent the first circular member from being removed therefrom. Attached to the first circular member is a resilient element such as rubber band which is in turn attached to or covered by an elongated piece of material, if attached, a second resilient member connects the elongated piece to a second circular member. The assembly may be disposed about an arrow with the second circular member disposed on the shaft-like portion of the rod for retaining the arrow in the nocked position until the arrow is moved longitudinally of itself whereby the second circular member will be moved off the cantilevered end of the shaft-like portion. In one embodiment the arrow is released as it moves forwardly and in the other embodiment it is released as it is drawn rearwardly.

3,606,876
HEAT EXCHANGER CELL FOR GAS-FIRED FURNACE
Donald R. Smith, Diamond Bar, and Adrian V. Cavestany, Pasadena, Calif., assignors to Carrier Corporation, Syracuse, N.Y.
Filed May 7, 1970, Ser. No. 35,371
Int. Cl. F24c *3/00;* **F24h** *3/00*
U.S. Cl. 126—91R **6 Claims**

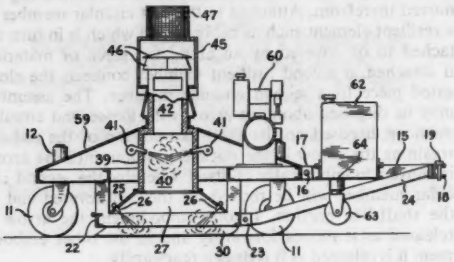


The discharge chamber of the heat exchanger cell has an inlet slot extending lengthwise of the chamber which has an open discharge end. A trough-shaped baffle extends above the slot with the apex of the baffle in proximity to the slot, the baffle being positioned medial of the side walls of the chamber. One end of the baffle is fixed at the open end of the chamber. The sides of the baffle at the opposite end thereof are provided with arcuate tabs which yieldingly engage the side walls of the chamber. Such frictional engagement maintains the baffle in proper position and permits expansion and contraction of the baffle relative to the discharge chamber of the cell.

3,606,877
SMOKELESS MOBILE FIELD BURNER INCINERATOR
Bert E. Shipp, 2311 SW. Iron Mountain Blvd., Lake Oswego, Oreg. 97034
Filed Oct. 13, 1969, Ser. No. 865,606
Int. Cl. A01m *1/20, 15/00*
U.S. Cl. 126—271.2A **10 Claims**

A vehicle on caster wheels has a hood a short distance above the ground equipped with oil burners forming a primary combustion chamber to consume all burnable material on the ground. A secondary combustion chamber burns and eliminates the smoke from the primary combustion chamber and a water spray scrubber removes

cinders and fly ash so that only relatively clear combustion gases are discharged into the atmosphere. The vehicle is of a width appropriate for travel on a public

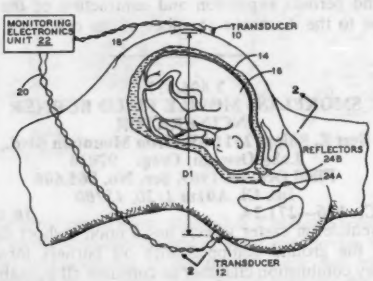


road and is equipped with a drawbar which may be shifted to one side of the vehicle so that in use it is drawn sideways across a field to burn a wide swath equal to the length of the vehicle.

3,606,878
NEEDLE INSTRUMENT FOR EXTRACTING BIOPSY SECTIONS
Howard B. Kellogg, Jr., 3843 92nd NE., Bellevue, Wash. 98004
Filed Oct. 4, 1968, Ser. No. 765,161
Int. Cl. A61b *10/00*
U.S. Cl. 128—2B **2 Claims**

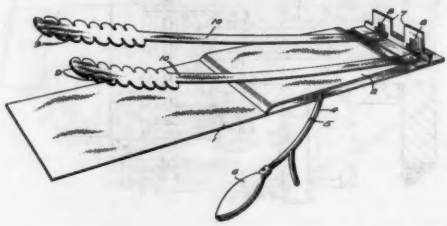
Specimen tissue drawn by suction into a specially formed side port adjacent the hollow penetrating needle tip is severed by forward motion of a tubular cutter slidable in the needle passage through prehensile application of thumb pressure on the outer end of an actuator rod. Suction is applied to the needle passage behind the cutter and reaches the port through passage in the cutter itself so as to help retain the specimen in the cutter cup. The cutter is removable to facilitate dislodging of the specimen and to sharpen and clean the cutter.

3,606,879
MONITORING THE PHYSIOLOGICAL PHENOMENA OF CHILDBIRTH WITH ULTRASOUND
Jerry R. Estes, Boulder, Colo., assignor to Electro Medical Systems, Inc., Englewood, Colo.
Filed June 17, 1968, Ser. No. 737,608
Int. Cl. A61l *5/02*
U.S. Cl. 128—2.05R **11 Claims**



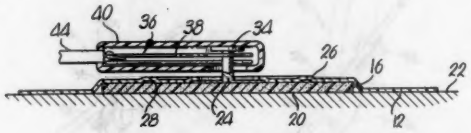
An ultrasonic apparatus for monitoring, during childbirth, the physiological phenomena of fetal heartbeat, cervical dilatation and uterine contraction. Fetal heartbeat is monitored by indicating changes in the frequency of ultrasonic waves passing through the fetus due to the Doppler effect caused by movements of the fetal heart or blood. Uterine contraction is monitored by indicating changes in transit time of pulses of ultrasonic energy. To measure cervical dilatation, two reflectors are clipped to the mouth of the cervix and ultrasonic pulses from an external transducer are directed to the reflectors. The transit time difference between the reflected signals indicates the dilatation.

3,606,880
BLOOD PRESSURE CUFF
Benjamin C. Ogle, Jr., 2930 McClure St., Oakland, Calif. 94609
Filed Apr. 18, 1969, Ser. No. 817,343
Int. Cl. A61b *5/02*
U.S. Cl. 128—2.05C **6 Claims**



A blood pressure cuff made to be disposable, having a cover sheet of relatively thin material provided with a closed envelope adjacent one end thereof containing an elastic or plastic bag adapted to be inflated and to be connected with a tube leading out of the envelope for attachment of a bulb and a manometer. Attached to the end of the sheet is means for anchoring the cuff about the limb after wrapping it therearound.

3,606,881
CONDUCTIVE RUBBER ELECTRODE
Riley D. Woodson, 2012 W. 50th Terrace, Shawnee Mission, Kans. 66205
Continuation of abandoned application Ser. No. 640,028, May 22, 1967. This application Feb. 20, 1970, Ser. No. 12,904
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06E **2 Claims**



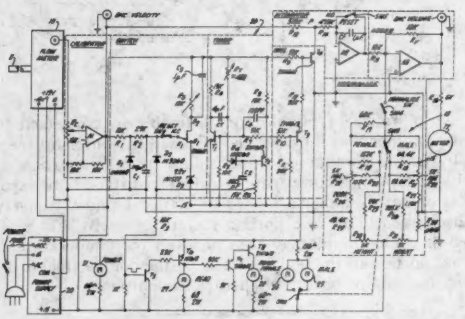
A throwaway item for effecting an electrical connection with the skin comprises a skin-contacting electrode of flexible, conductive plastic material held against the skin by a pliant, adhesive member to which the electrode is adhered. A terminal is mounted on the electrode and extends therefrom to provide a connection point for external electrical apparatus, such as an electrocardiograph machine or a heart pacer. A connector clip is electrically

connected with the apparatus by a lead and is attached to the terminal after the item is applied to the skin. The method of applying the item to the skin to effect an electrical connection therebetween is characterized by pressure responsive adhesive attachment and by both the skin and the face of the item in contact therewith being dry.

3,606,882
ECG PROCESSING SYSTEM FOR P- AND QRS-WAVE CHARACTERISTICS
Zenmon Abe, Takaji Suzuki, and Masayuki Tsuneoka, Kokubunji-shi, and Eiichi Kimura, Teizo Akazome, Kanji Obayashi, and Gengo Kasai, Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Apr. 11, 1969, Ser. No. 815,305
Claims priority, application Japan, May 20, 1968, 43/33,601
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06A **16 Claims**

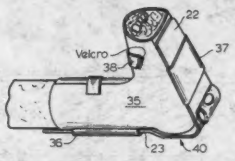
A system for diagnosing heart diseases employs analog and digital circuitry which separates the P wave or the QRS wave from a waveform of cardiac potential. This waveform of cardiac potential includes the P wave, the QRS wave and the T wave. Through a plurality of storage and sampling elements, the width and amplitude of the QRS wave or the width, number of peaks and characteristics of the P wave are determined.

3,606,883
SPIROMETER WITH NORMALIZING MEANS
Kurt P. Poirier, Sacramento, and Paul A. Lux, South Gate, Calif., assignors to Sutter Hospitals Medical Research Foundation, Sacramento, Calif.
Filed Feb. 3, 1969, Ser. No. 796,055
Int. Cl. A61b *5/08*
U.S. Cl. 128—2.08 **6 Claims**



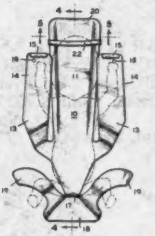
A spirometer has a flowmeter for measuring the flow rate of air blown through a tube by a patient, and a calibrator for producing an electrical signal proportional to the volume per second of air expired. The electrical signal is detected by a switch which actuates a timer for holding a gate open for one second to apply the electrical signal to an integrator for one second to produce an output signal representing the volume of air expired by the patient in one second. A normalize circuit produces an output signal representing the volume of air expired in one second by a normal person having the same height, sex, and age as the patient. The output signals from the normalize circuit and the integrator are compared to produce a signal representing the patient's deviation from normal.

3,606,884
FOOT-BOOT APPARATUS
Mary A. Peter, 2710 McDowell St., Durham, N.C. 27705
Filed Mar. 17, 1969, Ser. No. 807,546
Int. Cl. A61f *3/00*
U.S. Cl. 128—80 **2 Claims**



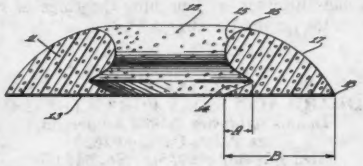
A medical apparatus for immobilizing and protecting the feet of bed patients incorporates a pair of padded boots which are removably secured to a pair of L-shaped brackets and the brackets are adjustably mounted on a spacer bar.

3,606,885
INFANT HOLDER
Douglas W. Lund, Sacramento, Calif. (6837 Ridgeway Drive, Pollock Pines, Calif. 95726)
Filed May 2, 1969, Ser. No. 821,367
Int. Cl. A61f *5/37*
U.S. Cl. 128—134 **4 Claims**



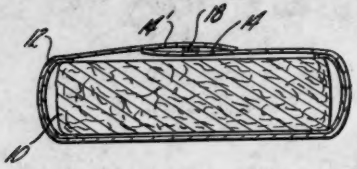
An infant holder of a preformed unitary plastic body by which an infant can be supported either in a relatively fixed supine position or in a suspended upright position for the making of an X-ray or other treatment or operation, and which not only will not interfere with the X-ray but will stand sterilization.

3,606,886
PRESSURE RELIEF CUSHION
Ernst Bittner, Frankfurt am Main, Germany, assignor to The Scholl Mfg. Co., Inc., Chicago, Ill.
Filed Dec. 29, 1969, Ser. No. 888,573
Claims priority, application Germany, Aug. 29, 1969, P 19 43 892.7
Int. Cl. A61f *5/30*
U.S. Cl. 128—153 **7 Claims**



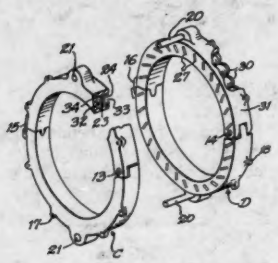
Pressure relief cushion, such as a corn ring, comprising a body of a flexible foam material having a central aperture therein, the wall of the body which defines the aperture having a groove extending radially outwardly from the wall toward the periphery of the body.

3,606,887
OVERLAP SEAL AND SUPPORT STRIP FOR A SANITARY NAPKIN WRAPPER
Robert J. Roeder, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Feb. 5, 1970, Ser. No. 8,832
Int. Cl. A61f *13/16*
U.S. Cl. 128—290R **8 Claims**



A sanitary napkin designed for disposal in conventional toilet systems includes a conventional pad enclosed in a fluid pervious wrapper which has longitudinally extending overlapping edges. A layer of hydroxylalkylated cellulose is positioned between the overlapping edges and bonded thereto so that sufficient strength to perform the support function will be available but which layer will readily disintegrate in an excess of water to provide flushability.

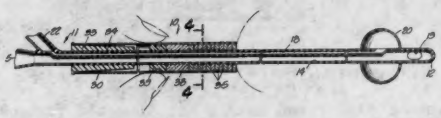
3,606,888
STAPLING APPARATUS FOR ANASTOMOSIS OF HOLLOW VISCERA
Jack E. Wilkinson, 2411 Divisadero St., Fresno, Calif. 93271
Filed June 30, 1969, Ser. No. 837,560
Int. Cl. A61b *17/11*
U.S. Cl. 128—334 **4 Claims**



Anastomosis by simultaneous setting of a full 360° annular array of staples to join cut ends of a hollow viscus (i.e. intestinal tube or blood vessel) by everting the cut ends through and outwardly between a pair of opposed staple-setting split rings, operating the rings to staple the everted ends together, and opening the rings to remove them from the repaired viscus.

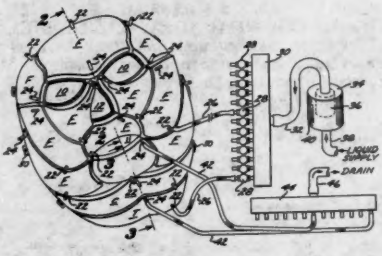
3,606,889
GUARD ACCESSORY FOR CATHETER
Dennis Arblaster, 34081 La Serena, Dana Point, Calif. 92629
Filed July 30, 1969, Ser. No. 846,059
Int. Cl. A61m *25/00*
U.S. Cl. 128—349 **12 Claims**

A sterile guard accessory for assembly over the tip end of a retention type catheter to safeguard the sterile condition of the catheter exposed beyond the urethral orifice. The accessory includes a readily expandable and collapsible guard tube enclosing a stack of sterile cushions at its forward end and sized to have a snug fit with the catheter for retention in adjusted position thereon with the advance cushion seated comfortably against the



urethral orifice. The cushions are weakened to facilitate detachment of a soiled cushion and exposure of the next sterile cushion. The accessory is equally effective for men and women.

3,606,890
BEAUTY TREATMENT APPARATUS
Walter Gilbert, 235 S. Occidental Blvd., Los Angeles, Calif. 90057
Filed July 9, 1969, Ser. No. 840,261
Int. Cl. A61f *7/00, 7/04*
U.S. Cl. 128—400 **10 Claims**

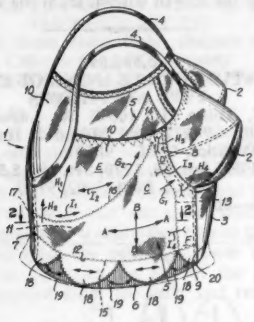


A plurality of pliable compartments so connected to one another that they may be disposed to conform generally to the contour of a user's face or other portion of the body, which compartments when so disposed are capable of having either a heated or cooled liquid selectively discharged to all or a portion thereof, whereby said heated or cooled liquid may raise or lower the temperature of that portion of the body covered by the compartments being treated for beauty or therapeutic purposes.

3,606,891
LONG LINE BRASSIERES
Joseph P. Marcario, Saddle Brook, and Jack J. Locascio, Bayonne, N.J., assignors to International Playtex Corporation, New York, N.Y.
Filed Feb. 26, 1970, Ser. No. 14,420
Int. Cl. A41c *3/00*
U.S. Cl. 128—427 **20 Claims**

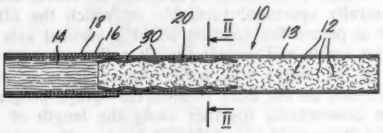
The long line brassiere disclosed is so constructed so as to exert and absorb to desired degrees forces in selected anatomical areas thus allowing for the elimination of stays or other rigid supports. Such is accomplished by combining with the generally non-stretchable breast cups and center panel of the brassiere, stretchable dorsal panels having a plurality of zones of varying stretch characteristics with the zone having the greatest resistance to stretch in an area relatively closely spaced apart from the breast cups and extending along the lowermost edge

of the dorsal panel for the major lateral extent of such dorsal panels. There is additionally disclosed a collar which underlies the dorsal panels having zonal stretch



characteristic disparity with the zones so oriented with respect to each other so as to provide a predisposition for a controlled flare of the collar along the waistline of a wearer.

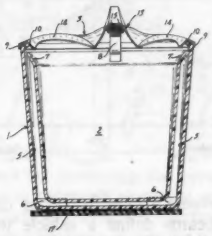
3,606,892
DELAYED VENTILATION CIGARETTE
Gerald M. Wilson, Howardsville, Va., assignor to Philip Morris Incorporated, New York, N.Y.
Filed Dec. 5, 1969, Ser. No. 882,601
Int. Cl. A24d *1/02*
U.S. Cl. 131—10A **8 Claims**



A delayed dilution or ventilation type cigarette in which the cigarette has an inner sleeve of a suitable material enclosing the tobacco filler along a length thereof from the butt end a distance in the direction of the other end. The inner sleeve in turn is enclosed by the conventional or outer paper wrapper of the tobacco cylinder, such sleeve including projections or openings in the surface thereof which cooperate with the inside surface of the outer wrapper to form a series of cigarette ventilation passages within the cigarette structure, the ventilation passages being placed in communication with atmosphere only after about half the length of the tobacco cylinder length has been smoked.

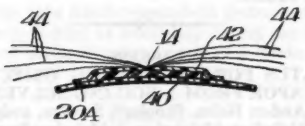
3,606,893
SAFETY ASH TRAY FOR VEHICLES
Milton W. Verberg, 3069 S. 36th St., Milwaukee, Wis. 53215
Filed Mar. 13, 1970, Ser. No. 19,208
Int. Cl. A24f *19/02*
U.S. Cl. 131—232 **10 Claims**

A bucket type container has an inner removable ash tray of substantial depth adapted to be partially filled with water. A removable cover for the container has a handle extending across the same between two large openings and providing holding means for cigarettes whereby the lighted end of the cigarette is always positioned above either opening so that the ashes will always drop into the water and become extinguished. The structure provides a guard which prevents ashes from falling into the space between the inner tray and the outer container. A strip of rubber-like material such as rubber backed carpeting is secured to the bottom of the container and is adapted to support and retain the container in an up-



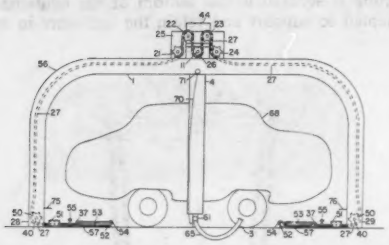
right position on the floor of an automobile or on a boat deck or the like. The bottom of the container may be curved or crowned to apply to the drive shaft hump in an auto floor board. One or more bins may be hung on the sides of the container for storing smoking material or for use in retaining waste and the guard consists of an inclined wall portion on the upper end of the inner tray which is available for use as a pipe knocker.

3,606,894
HAIRPIECE, SCALP BASE THEREFOR AND METHOD OF MAKING THEM
James J. Servino, New Castle, Del. (12 S. Union St., Wilmington, Del. 19805)
Filed Feb. 17, 1969, Ser. No. 799,654
Int. Cl. A41g *3/00*
U.S. Cl. 132—53 **8 Claims**



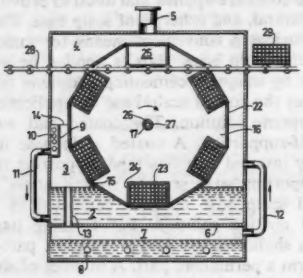
A piece of silk (blocked to head contour) is coated on its convex surface by a liquid neoprene solution to which a small amount of oil-base flesh-colored tint is added. One or two coats are applied and dried to provide a strong, resilient, natural, and waterproof scalp base. The neoprene coating provides a convenient means for making attachments to the scalp base. Hair is applied by any feasible method or by uniquely cementing neoprene tacked wefts of hair over the coated scalp base by application of additional neoprene solution. The coated and wefted scalp base is self-supporting. A coated scalp base having conventionally inserted hair has tape-supporting ribbons and a part-supporting strip secured over it under patches of the coated scalp base material cemented by the aforementioned coating solution. Part-forming hairs are inserted at a shallow angle into a neoprene part-supporting strip to form a permanent part. A number of short burned hairs extend from the front edge of the scalp base under longer overlying hairs to provide a natural hairline. The scalp base is perforated to pass scalp exudants through it either by inserted hairs or independent piercing.

3,606,895
VEHICLE WASHER AND DRIER
William Bithol Brown, Granby, Mo. (522 W. 39th St., Topeka, Kans. 66609)
Filed Apr. 23, 1970, Ser. No. 31,263
Int. Cl. B60s *3/04*
U.S. Cl. 134—58R **6 Claims**



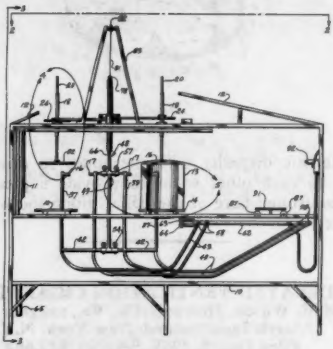
A pair of arcuate beams mounted on a surface are provided. The beams define a vehicle washing position. The beams substantially follow the top contour of the vehicle to be washed and dried. Without the drying mode, an inverted U-shaped spray unit is provided and movably mounted to the tops of the beams by rollers mounted to roll on top of the beams and rotatably mounted on a shaft that is rotatably mounted on the spray unit top. A pair of chains are mounted on the tops of the beams. A plurality of idler sprockets are rotatably mounted to the top sides of the spray unit. A pair of drive sprockets are mounted on the ends of the shaft. The chains are interwoven through the drive and idler sprockets so that when the drive sprockets are rotated by a reversible electric motor operatively connected to the shaft the spray unit is moved back and forth over the vehicle to be washed. The spray unit will substantially follow the contours of the vehicle to be washed. With the drying mode, an inverted U-shaped drier unit is provided. Air blowers are mounted to the bottoms of the drier unit air ducts. In this mode, spray pipes, idler sprockets, shaft and electric motor are mounted to the drier unit air ducts instead of the spray unit and the vehicle can be dried as well as washed.

3,606,896
APPARATUS FOR DEGREASING OBJECTS WITH VAPOR FROM A BOILING SOLVENT
Kurt Anders Holm, Skoghall, Sweden, assignor to Uddeholms Aktiebolag, Uddeholm, Sweden
Filed June 27, 1969, Ser. No. 837,094
Claims priority, application Sweden, July 17, 1968, 9,821/68
Int. Cl. B08b *3/04*
U.S. Cl. 174—79 **8 Claims**



An apparatus for removing grease, oil and fat from articles consists of means for boiling a solvent so that the vapor fills a chamber in which the cool articles are placed. The articles are situated in a rotatable cylinder which moves the articles down into the vapor zone and up from the vapor zone. The cylinder is of such a size that it nearly fills the cross sectional area of the apparatus, thus reducing the loss of solvent from the vapor zone.

3,606,897
APPARATUS FOR CLEANING OF CANISTER TYPE AIR FILTERS
Benjamin F. Tobin III, 10545 W. Loyola Drive, Los Altos, Calif. 94022, and Milton J. Harris, 12414 E. Howard, Whittier, Calif. 90601
Filed Jan. 26, 1970, Ser. No. 5,546
Int. Cl. B08b *3/02, 9/00*
U.S. Cl. 134—86 **12 Claims**



Apparatus for washing hollow cylindrical engine air cleaners or filter elements on inside and outside surfaces simultaneously and while the filter is in a vertical orientation. A pair of washing stations are provided, each with a centrally apertured turntable on which the filter element is placed for rotation about a vertical axis. Spray nozzles inside and outside the filter element wash a portion of the length with a fan shaped spray of cleaning liquid, and as the filter rotates, the sprays progressively move downwardly together along the length of the filter for thoroughly and uniformly washing the entire length of the filter. The length of travel and the radial position of the spray nozzles relative to the turntable are variable for accommodating different lengths and diameters of filters. A pair of cleaning stations are provided in a preferred embodiment so that a balanced spray nozzle assembly can be translated along the length of the filters by a simple ratchet mechanism. A station may also be provided for manual inspection and cleaning of air filters.

3,606,898
CRUTCH SUPPORT
Marino N. Harocopo, Villa Casa Silva, Via Fontana Vecchia 5, Taormina, Sicilia, Italy
Filed May 23, 1969, Ser. No. 827,242
Int. Cl. A61h *3/02*
U.S. Cl. 135—49 **2 Claims**

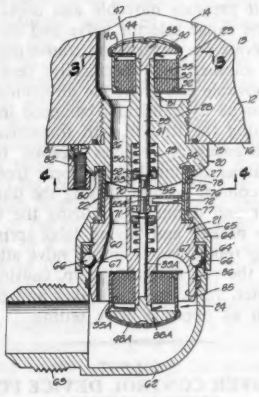
Crutch support means in the form of a tripod wherein at least one of the tripod members is a crutch and the

other two tripod members are supporting legs so that the crutch may be maintained in a generally upright position when not in use.

3,606,899
PIPELINE TRANSPORTATION OF HIGH VISCOSITY FLUIDS
J. O. Scott, Tulsa, Okla., assignor to Cities Service Oil Company
No Drawing. Filed June 29, 1970, Ser. No. 50,879
Int. Cl. F17d *1/18*
U.S. Cl. 137—13 **7 Claims**

Described is a method for lowering the viscosity of a fluid being transferred in a pipeline by the introduction of a pelletized radioactive material, for example uranium oxide and its fission products, into the fluid that is being transported. The fluid and entrained radioactive material is then pumped at a controlled rate so that sufficient heat is released from the pellets to lower the viscosity of the pipelined fluid. At the exit of the pipeline the pellets are separated from the fluid and reused or discarded.

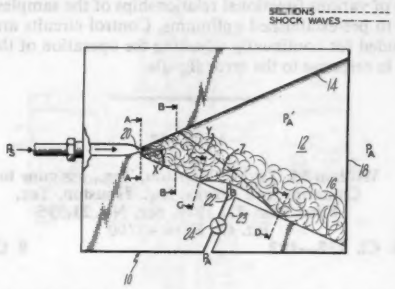
3,606,900
SAFETY VALVE
Wolfgang Wunderlich, Saugus, Calif., assignor to The Rucker Company
Filed Sept. 22, 1969, Ser. No. 859,691
Int. Cl. F16k *7/00*
U.S. Cl. 137—68 **10 Claims**



The application discloses a dual safety valve for the fuel systems of aircraft or the like in which a pair of wound clock spring actuators encased in boots and located in fuel passages are interconnected by means normally holding the springs wound but subject to releasing the springs and permitting them to unwind and expand their covering boots and thereby close the fluid passages in which they are located when the interconnecting means are subjected to undue external force.

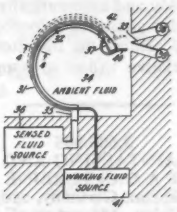
3,606,901
MONOSTABLE FLUIDIC SWITCH
Raymond V. Thompson, Simsbury, Conn., assignor to Chandler Evans, Inc., West Hartford, Conn.
Filed Sept. 5, 1969, Ser. No. 855,672
Int. Cl. F15c *1/10*
U.S. Cl. 137—81.5 **12 Claims**

Monostable operation of a supersonic fluidic switch is disclosed. Fluid from a pressurized source is injected into a reaction chamber at supersonic velocity. Either by means of offsetting one wall only of the chamber at the throat of the injection nozzle and/or by the creation of an artificial ambient pressure within and at one side of the chamber. The fluid jet will be caused to normally attach to one wall of the chamber. Monostable switching



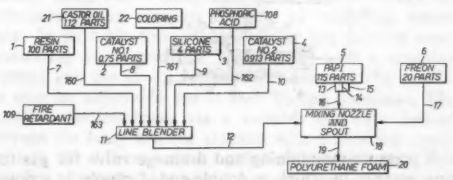
action is achieved by increasing the pressure within the recirculation region produced along the wall to which the supersonic jet normally attaches thereby reversing the transverse pressure unbalance across the jet.

3,606,902
BOURDON TUBE FLUIDIC TRANSDUCER
Jeffrey N. Shinn, Scotia, N.Y., and Carl W. Woodson, Lomita, Calif., assignors to General Electric Company
Filed May 15, 1969, Ser. No. 824,984
Int. Cl. F15b *5/00, 13/02;* **G05d** *16/00*
U.S. Cl. 137—83 **5 Claims**



A Bourdon tube which responds to pressure changes in a sensed fluid is used to selectively deflect the flow of a working fluid between various ports of a fluidic receiver.

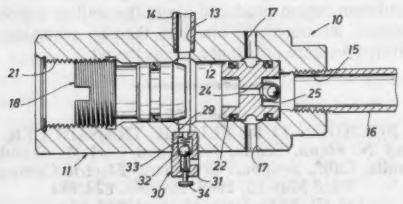
3,606,903
METHOD AND APPARATUS FOR PRODUCING ISOTROPIC FOAMED STOCK
Lawrence C. Porter, Palos Verdes Peninsula, and Kenneth E. Graves, Saratoga, Calif., assignors to The Upjohn Company, Kalamazoo, Mich.
Filed Jan. 30, 1968, Ser. No. 701,596
Int. Cl. G05d *21/02*
U.S. Cl. 137—88 **33 Claims**



An improved one-shot system and process for producing polyurethane foam stock and the like, including measurement circuits for deriving digital measurements of parameters such as the mass transfer rates of the various constituents, and further including an automatic controller system responsive to such measurements for adjusting and

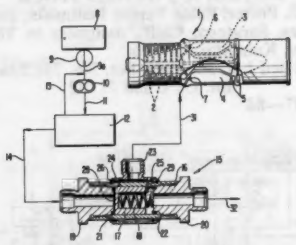
controlling the parameters with respect to preselected values. A controller system is provided for continuously sampling the various incoming measurement signals sequentially, and for deriving error signals from a comparison of various functional relationships of the samples relative to pre-established optimums. Control circuits are also included for continually adjusting the operation of the system in response to the error signals.

3,606,904
VALVE
William M. Taylor, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.
Filed Mar. 23, 1970, Ser. No. 21,595
Int. Cl. F16k *45/00*
U.S. Cl. 137—102 **9 Claims**



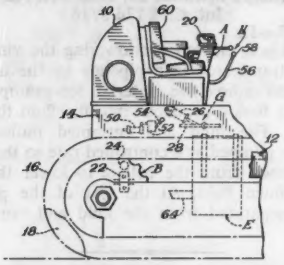
A valve for quickly and automatically shifting between alternate positions for admitting a source of fluid pressure to an operator and venting the operator, respectively, in response to the relative values of supply and operator pressure.

3,606,905
PRESSURE-MAINTAINING AND DRAINAGE VALVE OF A GAS TURBINE ENGINE
Adolf Fehler, Puchheim, Germany, assignor to Motoren- und Turbinen-Union Muenchen G.m.b.H., Munich, Germany
Filed Sept. 30, 1969, Ser. No. 862,317
Claims priority, application Germany, Oct. 10, 1968, P 18 02 275.8
Int. Cl. F16k *15/02*
U.S. Cl. 137—107 **10 Claims**



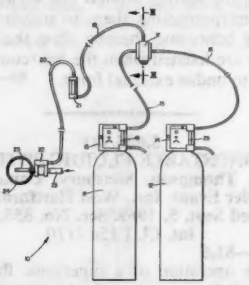
A pressure-maintaining and drainage valve for gas turbine engines in which a double-ended nipple is screwed into each end of the valve body cylinder accommodating a reciprocating spool-type control piston valving control openings in the cylinder; the spool-type control piston alternately abuts against seals provided at the mutually facing end faces of the nipple to seal off the communication through that nipple, against the seals of which it abuts.

3,606,906
FORWARD-REVERSE DRIVE CONTROL PROVIDING AUTOMATIC BRAKING
Daniel B. Shore, Niles, Ill., assignor to International Harvester Company, Chicago, Ill.
Original application Dec. 11, 1967, Ser. No. 689,549, now Patent No. 3,458,018, dated July 29, 1969. Divided and this application June 3, 1969, Ser. No. 830,035
Int. Cl. G05d *7/03*
U.S. Cl. 137—112 **6 Claims**



Tractor having dump valve and forward-reverse drive control employing same, effective to automatically brake the tractor when reversing the tractor's direction of motion. The tractor has brakes, a reversible transmission controlled by the dump valve, a range selector valve having a control portion, and a run detector pump to sense direction of rolling movement of the tractor and having a directionalized pump output. The dump valve generally receives against pressure movable end areas thereof an output from the range selector valve and directs control pressure to operate the brakes and transmission in alternation to one another and, specifically: receives against the pressure movable end areas the directionalized pump output so as to be hydraulically balanced in a centered position operating the tractor with transmision engaged and brakes disengaged; receives against the pressure movable end areas an unbalancing force from the range selector valve control portion causing the dump valve to shift off center and dump, neutralizing the transmission and setting the brakes; and having valve springs effective to mechanically rebalance the dump valve attendant with slow down of the run detector pump, causing the dump valve to recenter, releasing the brakes and engaging the transmission in an opposite drive setting.

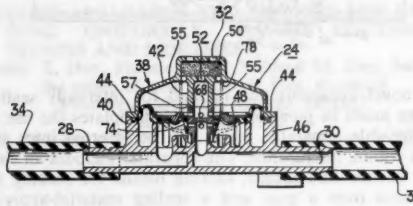
3,606,907
SWITCHOVER CONTROL DEVICE FOR GAS SUPPLY SYSTEM
Nyyrikki K. Stenberg, Roslyn, Pa., assignor to Capital Controls Co., Inc., Colmar, Pa.
Filed Mar. 20, 1970, Ser. No. 21,245
Int. Cl. F16k *11/10*
U.S. Cl. 137—113 **12 Claims**



A switchover device is provided, for a gas supply system having a plurality of gas supplies therefor, for alter-

native use, and with the device being adapted for automatically switching from one supply to another, upon depletion of the one supply.

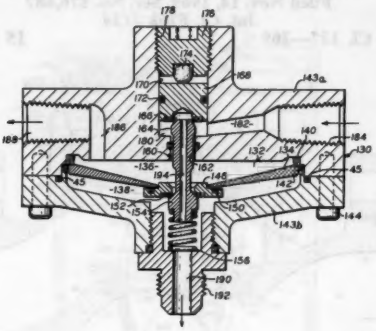
3,606,908
VENTILATION SYSTEM FOR VOLATILE FLUID
William C. Riester, Williamsville, N.Y., assignor to Trico Products Corporation, Buffalo, N.Y.
Filed Nov. 26, 1969, Ser. No. 880,207
Int. Cl. F16k *17/196*
U.S. Cl. 137—116 **8 Claims**



A system for storing volatile materials and disposing of excess vapors and overflow includes a reservoir which may be, for example, a gasoline tank for an automobile, and filtering apparatus connected to the reservoir through a multidirectional valve assembly employing a pressure differential actuated apertured diaphragm having a lip circumscribing the aperture which serves as a valve element slidable on a tubular valve seat. The valve is spring biased to a neutral position sealing the tank outlet and remains in that position when the pressure in the storage tank is such that the tank can contain the vapors. When ambient conditions are such as to cause expansion of the fluid and the vapor the diaphragm and valve move to an open position for permitting the vapor or overflow fluid to flow through filtering and disposable apparatus. If the filter or any of the lines leading thereto or therefrom become clogged, or if pressure increases in the tank at a rate which causes an increase of pressure on the diaphragm, a second aperture is opened to permit venting to atmosphere. If subatmospheric pressure conditions exist in the reservoir the diaphragm is drawn to a position overlying conduits on the external wall of the tubular valve seat to permit venting to the atmosphere for pressure equalization.

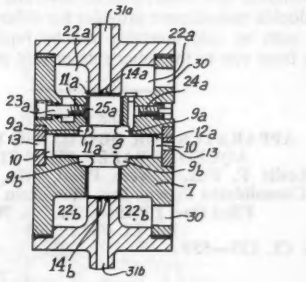
3,606,909
COMBINED PRESSURE REGULATOR AND RELIEF VALVE WITH SPRING WASHER
Slawomir Kowalski, Rockaway, Donald A. Worden, Pompton Plains, and Alfred Tillman, Mount Tabor, N.J., assignors to Marotta Valve Corporation, Boonton, N.J.
Original application Nov. 29, 1967, Ser. No. 686,644, now Patent No. 3,508,568. Divided and this application Apr. 8, 1970, Ser. No. 26,525
Int. Cl. G05d *11/02*
U.S. Cl. 137—116.3 **3 Claims**

This specification discloses a pressure regulator that employs a Belleville washer, in place of the usual flexible diaphragm or sliding piston, which responds to pressure changes. The washer serves the function of both a diaphragm and a spring. By tapering the washer to less thickness toward its center opening, a softer spring rate is obtained; and a center valve element is held against the washer without connection thereto so as not to interfere with free dishing movement of the washer. A second valve element connected with the first operates when the first valve element moves as a unit with the center portion of the washer. One valve element controls downstream



pressure and the other operates as avent to relieve excessive pressure in the regulator.

3,606,910
PRESSURE REGULATOR
Jean G. P. Lombard, Boulogne-sur-Seine, and Claude T. Charcosset, Paris, France, assignors to Centre d'Etudes et de Recherches de la Machine-Outil, Neuilly-sur-Seine, Hauts-de-Seine, France
Filed Sept. 26, 1969, Ser. No. 861,269
Claims priority, application France, Oct. 14, 1968, 169,814
Int. Cl. F16c *39/04*
U.S. Cl. 137—118 **14 Claims**

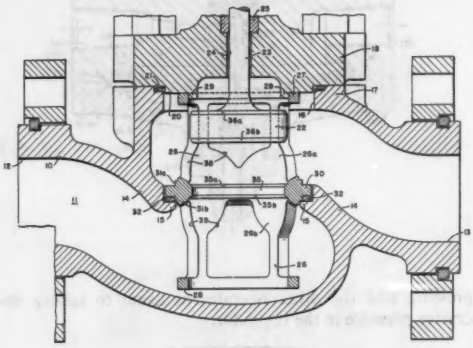


The pressure regulator for the supply of pressurised fluid to a hydrostatic support such as a stop, slide or bearing comprises a body having an internal cavity accommodating an element capable of restricted movement. In its basic form, the regulator has an inlet communicating via a restrictor in the body with a chamber opening into the cavity adjacent the element. The restrictor may be adjustable but is fixed during operation. The chamber communicates via a variable restrictor defined between the body and the element with a chamber opening into the internal cavity adjacent the element. This chamber communicates with the atmosphere either directly or via a restrictor which may be adjustable. This arrangement acts as a hydraulic spring biasing the element towards an outlet to the hydraulic support which outlet communicates with another inlet for pressurised fluid via a variable restrictor defined between the body and the element.

3,606,911
INVERTIBLE VALVE TRIM FOR CONTROL VALVES

Gareth Allan Keith, Needham, Mass., assignor to Masoneilan International, Inc., Norwood, Mass.

Filed Nov. 14, 1969, Ser. No. 876,687
Int. Cl. F16k 1/54
U.S. Cl. 137—269 15 Claims

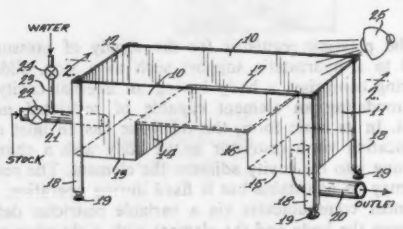


A valve trim cage with a tubular body provided with reversible ends and flow controlling port means differently characterized axially of the body. In a double embodiment the cage extends to either side of the valve body partition, and is provided with an intermediate double faced seat for the valve plug. In a single embodiment the cage engages a slip ring which seats also the valve plug. In the double embodiment the port means are differently characterized to either side of the valve seat, and in the single embodiment the port means are differently characterized at opposite axial end portions. The single embodiment provides for different flow controlling by inverting of the cage, and the double embodiment provides for different flow controlling both by said inverting and by repositioning of the plug from one to the other side of said partition.

3,606,912
APPARATUS FOR OBSERVING FLOWING AQUEOUS PAPER PULP STOCK

Leslie F. Fox, Stevens Point, Wis., assignor to Consolidated Papers, Inc., Wisconsin Rapids, Wis.

Filed Dec. 13, 1968, Ser. No. 783,491
Int. Cl. F17d 3/00
U.S. Cl. 137—559 6 Claims

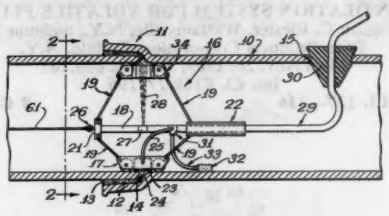


A device for observing the character of aqueous paper pulp stocks which comprises a receptacle, a dark colored transparent hyaline sheet supported substantially horizontally in said receptacle and means for continuously flowing aqueous paper pulp over said hyaline sheet for visual inspection.

3,606,913
APPARATUS FOR INTERNALLY SEALING PIPES

Gene G. Yie, Chicago, Ill., assignor to Institute of Gas Technology

Filed Dec. 13, 1968, Ser. No. 783,531
Int. Cl. F16l 55/18
U.S. Cl. 138—97 8 Claims



A novel apparatus and method for internally sealing leaking joints in pipelines which contemplates the use of a collapsible apparatus which can be inserted into, and travel within, the pipeline. The apparatus includes an electrical gas-locating means, locking means for locking the apparatus over a gap, and a sealing material-applying means for directly applying the sealing material to the located gap while the apparatus is in locked position over the gap.

3,606,914
WEBBING

Wolfgang Maiwald, Frankfurt am Main, and Helmut Rohser, Hofheim, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

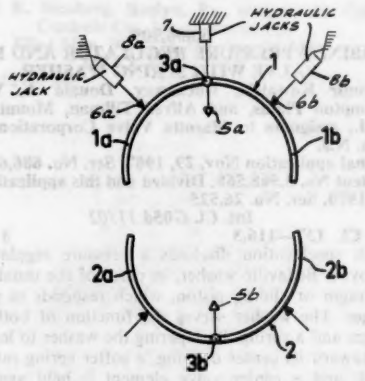
No Drawing. Filed May 2, 1969, Ser. No. 821,454
Claims priority, application Germany, May 8, 1968, P 17 60 360.0
Int. Cl. D03d 15/00
U.S. Cl. 139—420 8 Claims

The present invention provides a webbing whose warp threads consist of multifilaments of synthetic materials and whose weft threads consist of monofilaments of synthetic linear polyester material.

3,606,915
DEVICE FOR TRIMMING FELLED TREES

Karl Thore Lindblom, Alfta, Sweden, assignor to Ostbergs Fabrika AB, Alfta, Sweden

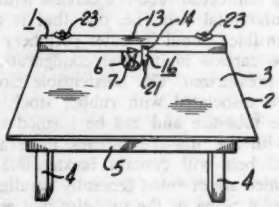
Filed Sept. 2, 1969, Ser. No. 854,460
Int. Cl. A01a 3/00; B27l 1/06; B27m 1/00
U.S. Cl. 144—2 2 Claims



A device for delimbing felled trees including a pair of shear knives which are axially displaced with respect

to each other and are adapted to embrace a tree to be delimbed. The shear knives have an arc-shaped cross-section and operate in the axial direction, each knife comprising two portions connected by a central joint, which portions define a semi-circle in the rest portion of the device. The two portions are movable toward and away from each other in a vertical plane common to the joints and there are provided means for controlling the movements of the joints and the rotational movements of the knife portions.

3,606,916
GAUGE APPARATUS AND METHOD FOR CUTTING UNIFORMLY SPACED ROUTERED TENONS AND MORTISES
Walter T. Day, Houston, Pa.; Mildred M. Day, heir of the estate of said Walter T. Day, deceased
Filed Sept. 30, 1969, Ser. No. 862,232
Int. Cl. B27f *1/08*
U.S. Cl. 144—87 **6 Claims**

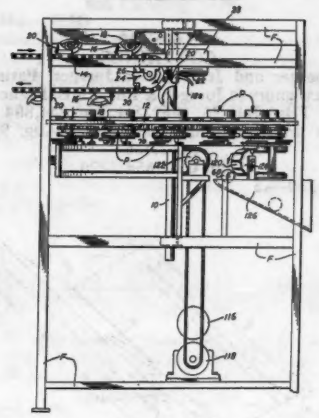


A router gauge for use in combination wtih a router table for cutting uniformly spaced routered mortises and tenons in the end of a workpiece. The gauge comprises an elongated guide bar having a slot in its bottom in a direction normal to the length of the guide bar to receive a guide key which is spring biased to be in a normally extended position from the guide bar. The guide bar is mounted on the router table relative to the router to adjust for the depth of cut to be made by the router in the workpiece. The mounting of the guide bar is done in a manner to properly position the guide key in a preselected distance from the router to guide the advancement of the workpiece during consecutive cutting of a series of uniformly spaced mortises in the workpiece.

3,606,917
PEELING MACHINE
Gerald J. Orlowski, Chicago, Ill., assignor to Korlow Corporation
Filed May 26, 1969, Ser. No. 827,672
Int. Cl. A23n *7/00*
U.S. Cl. 146—43 **28 Claims**

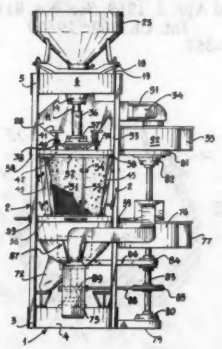
A peeling machine particularly designed for peeling onions by first cutting through the peelings thereof whereupon the peelings may be removed by air jets, brushing, vacuum and/or flotation on water. Onions having the root and stem cut therefrom, with the resulting ends of the onions being in parallel planes are delivered one at a time to a pocket of the peeling machine. The pocket has a pair of paralell side elements which cooperate with the parallel onion ends and orient the onion so that it can be rotated about its root-stem axis. While being so rotated, a specially designed peeling cutting blade revolves around the onion to cut through only its peeling. The cut peelings are then removed whereupon the peeled onions are in condition for discharge from the peeling machine.

A plurality of the pockets may be mounted on a carrier such as rotating disc for increased production from the machine, and the onions may be delivered to the succes-



sive pockets at a reception station of the machine and discharged therefrom at a discharge station of the machine.

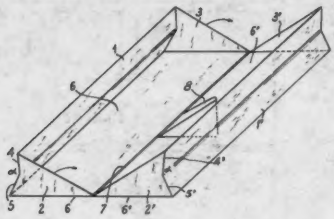
3,606,918
PORTABLE CONE TYPE RICE MILL
Sofronio M. Sian, 958 J. Rizal Ave., Makati, Rizal D–711, Philippines
Filed Mar. 13, 1969, Ser. No. 806,993
Int. Cl. B02b *3/00*
U.S. Cl. 146—266 **1 Claim**



The portable cone-type rice mill embodied in this invention consists of an upstanding frame on which are arranged in a super-imposed manner starting from the top, a hopper, a huller, a conical grain polisher and a bran chute. Between the huller and the grain polisher is a husk aspirator connected to a suction blower to suck away the husk from the grain falling from the huller, through the aspirator down to the polisher. Connected to the bottom of the polisher is a grain chute at the end of which is connected a conduit communicating with a second suction blower. The second suction blower is adapted to suck the bran from the polished grain falling from the grain chute.

A suitable drive means mounted on said frame is in turn connected to the common shaft of the blowers which shaft is in turn connected to the shafts of the polisher and huller which are joined by a movable coupling.

3,606,919
CONTAINER
Roger Joerger and Jean-Claude Joerger, Paris, France, assignors to Joerger & Fils, Paris, France
Filed July 25, 1969, Ser. No. 844,804
Claims priority, application France, Aug. 9, 1968, 162,436
Int. Cl. B65d 1/26
U.S. Cl. 150—.5 3 Claims

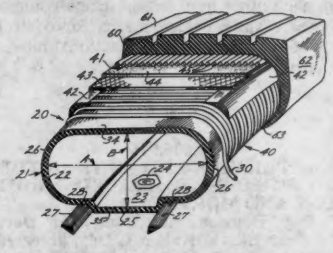


This invention relates to a container and, more particularly, to a container having two hinged portions which can be held in closed condition by the interengagement of locking walls associated with the portions.

3,606,920
SPEED SENSITIVE DUAL TREAD TIRE
George J. Kole, 4049 N. Kolmar Ave., Chicago, Ill. 60641
Filed Apr. 1, 1969, Ser. No. 811,715
Int. Cl. B60c 19/00
U.S. Cl. 152—352 9 Claims

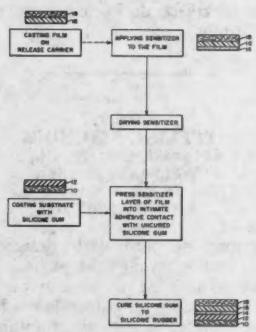
A treaded tire of the pneumatic type which has a localized circumferential increased weight area adapted to increases the diameter of a localized portion of the tire tread due to centrifugal force at high speeds. The increased diameter portion of the tread reduces the contact area between the tire and the road at high speeds, thereby reducing the drag while at the same time reducing heat and friction and preventing hydroplaning of the tire. The increased diameter portion may be constructed of a longer-wearing material than the remainder of the tread. The invention does not interfere with full tread contact at slow speeds or while braking the vehicle.

3,606,921
BELTED OVAL PNEUMATIC TUBE-TIRE
Charles E. Grawey, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed June 23, 1969, Ser. No. 835,499
Int. Cl. B60c 9/02, 15/02
U.S. Cl. 152—354 27 Claims



A pneumatic tube-tire is fabricated by applying inextensible reinforcing filaments on an oval torodial tube member which has its major axis parallel to the axis of revolution of the resulting tube-tire carcass and providing the resulting reinforced tube-tire carcass with an inextensible circumferential belt (i.e. one that is circumferentially inextensible) about its outer periphery to maintain the tube-tire carcass in its oval configuration when the tube-tire is pressurized. The inextensible circumferential belt may be associated with rubber stock forming the tread of the tube-tire and can be formed separately or integrally with the tube-tire carcass. Preferably, the circumferential belt will contain inextensible reinforcing filaments which are oriented generally parallel to the mid-circumferential plane of the tube-tire nad generally normal to the reinforcing filaments surrounding the tube-tire carcass. Spaced apart roll restraining hoops are placed within the reinforcing filaments surrounding the tube-tire carcass for lateral stability.

3,606,922
DRY PLANOGRAPHIC PLATE AND METHOD OF PREPARING SAME
Towers Doggett, Westbrook, Maine, assignor to Scott Paper Company, Delaware County, Pa.
Filed Aug. 12, 1969, Ser. No. 849,800
Int. Cl. C09j
U.S. Cl. 156—329 7 Claims


CASTING FILM ON RELEASE CARRIER
APPLYING SENSITIZER TO THE FILM
DRYING SENSITIZER
COATING SUBSTRATE WITH SILICONE GUM
PRESS SENSITIZER LAYER OF FILM INTO INTIMATE ADHESIVE CONTACT WITH UNCURED SILICONE GUM
CURE SILICONE GUM TO SILICONE RUBBER

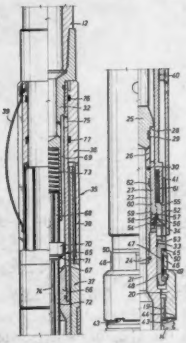
A new dry planographic plate having a non-ink receptive silicone rubber background area that does not require a fountain solution to repel printing ink and process of producing this new plate comprising applying the photoresponsive sensitizer to a polymeric support film and bringing the sensitizer layer into intimate adhesive contact with an uncured silicone gum and thereafter curing the silicone gum.

3,606,923

SUBSURFACE WELL APPARATUS

William O. Berryman, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Nov. 22, 1968, Ser. No. 778,156
Int. Cl. E21b *23/06, 33/128*
U.S. Cl. 166—125 7 Claims



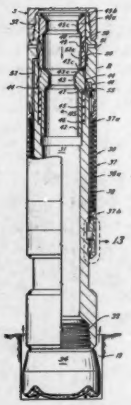
A setting tool apparatus for use in setting well packers in well bores includes inner and outer body structures coupled to the well packer and having means responsive to manipulation of the pipe string for causing relative longitudinal movement to set the well packer, releasable latch means for preventing setting of the packer during lowering into the well bore, and valve means in said inner and outer body structures for enabling testing of the pipe string for leaks at any time after the packer is set and drainage of fluid from the pipe string during withdrawal of the apparatus from the well bore.

3,606,924

WELL TOOL FOR USE IN A TUBULAR STRING

Billy C. Malone, Houston, Tex., assignor to Lynes, Inc.

Filed Jan. 28, 1969, Ser. No. 794,682
Int. Cl. E21b *33/127*
U.S. Cl. 166—187 42 Claims



A well tool incorporating a reinforced inflatable element which is carried by the drill string in the well bore and remains deflated during rotary drilling operations, which can be inflated to seal off the well bore to enable various operations to be performed in the well bore and the element thereafter deflated and rotary drilling operations resumed. This operation may be repeated as often as desired.

3,606,925

LIMITING CONTAMINATION OF WASTE DISPOSAL WELLS

Fred H. Poettmann, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

No Drawing. Filed Nov. 3, 1969, Ser. No. 873,669
Int. Cl. B65g *5/00*
U.S. Cl. 166—305D 6 Claims

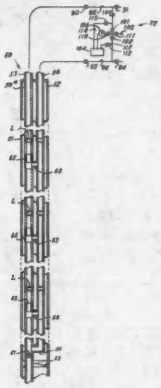
Contamination of underground aquifers by waste materials injected through disposal wells is limited by injecting a mobility buffer ahead of the waste material. The mobility buffer can be water containing a mobility reducing agent, e.g. water-soluble polymer, a water-external emulsion, or any other fluid containing a mobility reducing agent. A more favorable mobility ratio can be achieved by injecting a series of consecutively mobility graded fluids into the aquifer.

3,606,926

APPARATUS AND METHOD FOR INSTALLING AND REMOVING WELL TOOLS IN A TUBING STRING

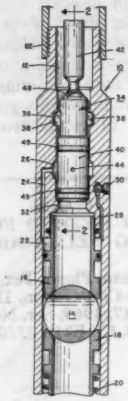
Harry E. Schwegman, Plano, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Apr. 17, 1969, Ser. No. 816,942
Int. Cl. E21b *23/02*
U.S. Cl. 166—315 54 Claims



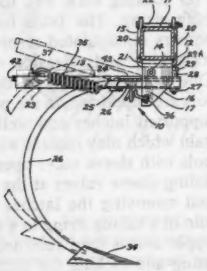
A well tool system for installing and retrieving well tools, such as gas lift valves, in a tubing string. A tubular latch is provided for locking each well tool at a landing nipple in the tubing string. The latch has locking keys with operator members manipulated responsive to a supporting probe for locking and releasing each latch at a landing nipple. One or a plurality of the latches with connected well tools are supported on the probe in tandem. The probe and supported latches and well tools are connected in a tool train which may include wireline or pump-down handling tools with sleeve valve operators for opening and closing sliding sleeve valves at the landing nipples when installing and removing the latches and well tools. The tool train is run in a tubing string to a depth below the lowest landing nipple and is then returned to the surface sequentially releasing and locking the latches at the landing nipples spaced along the tubing string. The latches and tools are retrieved by running the tool train with a probe downwardly sequentially releasing the latches and engaging them on the probe in end-to-end array. When all of the latches and well tools are released and on the probe, the tool train is returned to the surface. During both installing and removing the latches and tools, the sleeve shifting units in the tool train open and close the sleeve valves as required.

3,606,927
RUNNING IN AND OPERATION OF VALVES AND THE LIKE IN A WELL
Martin E. True and William E. Kanady, Houston, Tex., assignors to Esso Production Research Company
Filed Aug. 14, 1969, Ser. No. 850,144
Int. Cl. E21b *23/04*
U.S. Cl. 166—315 9 Claims



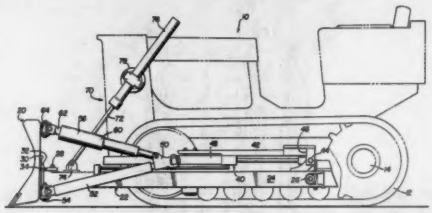
Valves and the like in a well such as a submarine well are operated by running a tubular member into the well production pipe from a reel at the surface and locking the tubular member to said valve and the like apparatus followed by flowing fluid under pressure through the tubular member to operate the valve and the like, the tubular member also being locked by fluid pressure. Thus, a tubular member provided with a telescopic member is run into the well production pipe and locked in a tubular housing connected to the valve and the like.

3,606,928
RELEASABLE CHISEL PLOW, CLAMP AND SHANK HOLDER
Sherman H. Quanbeck, Aneta, N. Dak. 58212
Filed Mar. 14, 1969, Ser. No. 807,347
Int. Cl. A01b *61/04*
U.S. Cl. 172—265 7 Claims



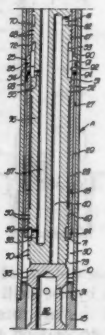
A chisel plow or cultivator clamp and shank holder utilizing two U-shaped brackets, one of which acts as a support for the shank, and the other of which acts as a clamp to clamp the shank holder onto a plow support beam. The shank holder includes resilient means for holding the shank in working position and letting it release when it strikes an obstruction.

3,606,929
HYDRAULIC CONTROL SYSTEM FOR EARTH MOVING IMPLEMENT
Claude M. Frisbee and Carl O. Pedersen, Burlington, Iowa, assignors to J. I. Case Company, Racine, Wis.
Original application Oct. 17, 1968, Ser. No. 768,435. Divided and this application May 20, 1970, Ser. No. 38,996
Int. Cl. E02f *3/76*
U.S. Cl. 172—804 13 Claims



A hydraulic control system for an earth moving implement which has a blade adjustably supported on a U-shaped frame with the free ends of its legs pivotally connected to a vehicle and the hydraulic control system includes fluid rams for (1) raising and lowering the frame with respect to the vehicle, (2) angling the blade with respect to the U-shaped frame about a vertical axis, and (3) prevent tilting of the blade with respect to the frame about a transverse horizontal axis. The hydraulic control system incorporates an interconnection between the rod ends of the anti-tilt rams with means for supplying a constant charging pressure to the rod ends of the anti-tilt rams. The charging means may include (1) a connection from the angling rams through a regulator valve to the rod ends of the anti-tilt rams; (2) a connection between one end of the lift cylinders through a regulator valve to the rod end of the anti-tilt rams; (3) a connection between the anti-tilt rams and the conventional pump of the transmission hydraulic system of the vehicle, or (4) a separate pump connected to the rod ends of the anti-tilt rams, all alternates.

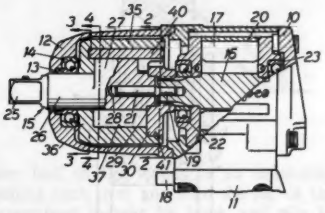
3,606,930
DOWN-HOLE DRILLING HAMMER
Alfred R. Curington, Houston, Tex., assignor to Baker Oil Tools, Inc., City of Commerce, Calif.
Filed Oct. 6, 1969, Ser. No. 863,988
Int. Cl. E21b *1/06*
U.S. Cl. 173—73 22 Claims



A down-hole drilling hammer embodying an outer housing structure connectible to a string of rotatable drill pipe through which compressed air is pumped. A

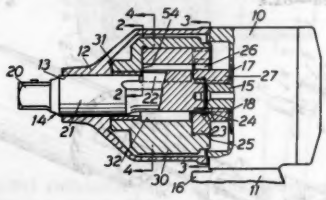
cylinder sleeve within the housing structure defines a high pressure air annulus and a low air pressure annulus therewith. A hammer piston reciprocates in the cylinder sleeve, the piston and cylinder sleeve having ports and passages to alternately communicate the high pressure and low pressure annuli with the cylinder sleeve first above and below the piston and then below and above the piston to reciprocate the piston and cause it to impact repeatedly upon an anvil connected to or integral with a bit rotatable by the drill string, the low pressure air exhausting through the bit to convey the cuttings upwardly around the drilling hammer and drill pipe to the drilling rig.

3,606,931
ROTARY IMPACT MOTOR
Karl Gosta Karden, Nacka, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden
Filed June 9, 1970, Ser. No. 45,047
Claims priority, application Sweden, June 19, 1969, 8,807/69
Int. Cl. B25d *15/00*
U.S. Cl. 173—93.5 **5 Claims**



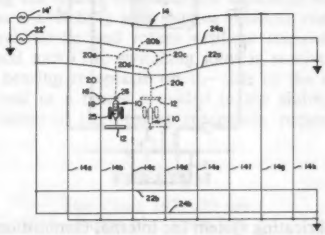
In a rotary impact motor for power driven fastener setting tools an impact dog is arranged in a hammer body pivotally about an axis spaced from but parallel with the axis of rotation of the hammer body. The impact dog takes respectively impact and release position with respect to a cam flank on an anvil which anvil is coaxial with the hammer body. The cam flank has the dual function of providing an impact surface for the impact dog and a cam surface cooperating with the portion of the impact dog leading in the rotational direction for pivoting the trailing portion thereof to impact position against that very same flank.

3,606,932
ROTARY IMPACT MOTOR
Knut Christian Schoeps, Nacka, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden
Filed June 16, 1970, Ser. No. 46,765
Claims priority, application Sweden, June 19, 1969, 8,808/69
Int. Cl. B25d *15/00*
U.S. Cl. 173—93.5 **7 Claims**



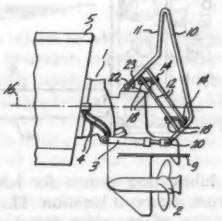
In a rotary bidirectionally operable impact motor for power driven fastener setting tools a recessed impact dog is journalled by its cylindrical back portion extending over more than 180 degrees in a journalling recess of a hammer body pivotally about an axis spaced from but parallel with the axis of rotation of the hammer body for taking impact and release positions with respect to opposed impact surfaces on an anvil coaxial with the hammer body and surrounded by a rotation cavity therein. The journalling recess is of larger diameter than said rotation cavity. End surfaces on the impact dog cooperate with the anvil for pivoting the impact dog to impact position while a drive element for the hammer body engages the impact dog for pivoting it to the release position. The end surfaces are transverse to the back portion of the impact dog as well as the recess thereof.

3,606,933
AUTOMATIC FARMING APPARATUS
Karl Rushing, Indianola, Miss., and John Clarence Allen, Jr., P.O. Box 87, Indianola, Miss.; said Rushing assignor to said Allen and Roy Rodgers Brashier
Application Apr. 5, 1967, Ser. No. 628,616, now Patent No. 3,468,391, dated Sept. 23, 1969, which is a continuation-in-part of application Ser. No. 531,603, Mar. 3, 1966, now Patent No. 3,468,379. Divided and this application Oct. 31, 1968, Ser. No. 772,256
Int. Cl. B62d *5/04*
U.S. Cl. 180—98 **5 Claims**



Automatic farming apparatus for use in farming a field wherein a tractor pulling a farming implement such as a plow is adapted to trace a path defined by a plurality of main tracing lines. A pair of secondary tracing lines are buried outside the edges of the field, and means are provided for causing the tractor to leave a main tracing line at the end of each row, and automatically move over to the adjacent secondary tracing line which it traces until it is turned toward another main tracing line. The turning operation between the main and secondary tracing lines is controlled as a function of the distance travelled by the tractor. The main tracing lines comprise a plurality of parallel connected wires extending from edge to edge across the field. An additional pair of control lines are buried at respective edges of the field to control the overall sequence of the vehicle turn sequence.

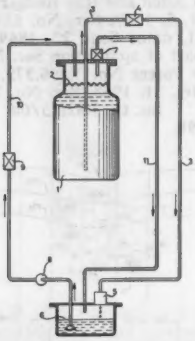
3,606,934
BOAT LADDER
Erling Roderic Johansen, 3616 NW. 65th Court, Seattle, Wash. 98107
Filed May 16, 1969, Ser. No. 825,217
Int. Cl. E06c *1/34, 5/06*
U.S. Cl. 182—97 **14 Claims**



A simple, sturdy ladder for entering a boat equipped with an inboard-outboard drive system is provided. A

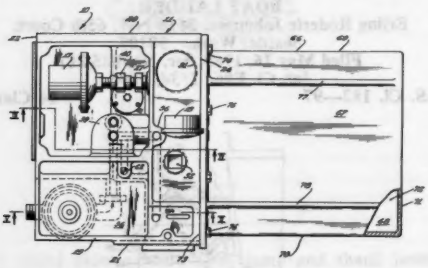
frame having a plurality of rungs or steps attached thereto is affixed to the upper rear portion of the outdrive unit of the boat.

3,606,935
LUBRICATING SYSTEM FOR INTERNAL COMBUSTION ENGINES
Veit John, Wiesbaden, Germany, assignor to Farbwerke Hoechst Aktiengeseilschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany
Filed Mar. 11, 1969, Ser. No. 806,054
Claims priority, application Germany, Mar. 16, 1968, F 55,086
Int. Cl. F01m 1/18
U.S. Cl. 184—6.1 5 Claims



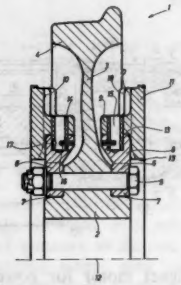
The lubricating system for internal combustion engines, particularly of automobiles, consists of an interchangeable tank for the oil, a dry sump and a pump sucking therefrom. Under the pressure produced by the pump in the tank, the oil flows to the lubricating points. In order to prevent that the lubricating system is without pressure during the pauses of the pump a non-return valve is inserted between the pump and the tank and a stop valve between the tank and the lubricating points.

3,606,936
OIL MIST LUBRICATION SYSTEM
Ronald F. Obergefell, Richmond Heights, Edward E. Kish, Cleveland Heights, and Gerald C. McMillen, Chagrin Falls, Ohio, assignors to Houdaille Industries, Inc., Buffalo, N.Y.
Filed Dec. 12, 1969, Ser. No. 884,478
Int. Cl. F16n 7/32
U.S. Cl. 184—6.26 6 Claims



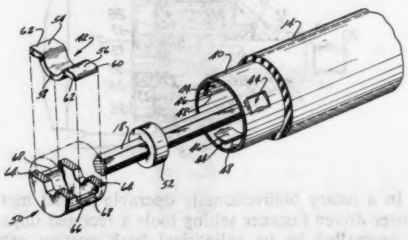
An oil mist lubrication system for lubricating various points of use from a central location. The system includes a housing structure of one-piece metal cast construction so configured and arranged as to accommodate various components of the system including an air filter, an air solenoid valve and a mist generating head. An oil reservoir is provided by a chamber formed in the housing structure and is open along one vertical side. Various polymorphic closure structures are provided for closing the open side of the oil reservoir chamber. The closure structures may be individually removably mounted on the housing structure for effectively varying the volumetric capacity of the oil reservoir merely by changing from one closure structure to another.

3,606,937
BRAKE DISK ASSEMBLY FOR RAILWAY VEHICLE WHEELS
Eberhard Falch and Franz Prahl, Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany
Filed Aug. 19, 1969, Ser. No. 851,192
Claims priority, application Germany, Aug. 20, 1968, P 17 80 246.9
Int. Cl. F16d 65/12
U.S. Cl. 188—218XL 4 Claims



A brake disk is mounted upon a railway wheel by means of an intermediate ring which may be positioned upon either the hub or within the rim of the wheel. The intermediate ring has a plurality of radially extending arms the ends of which support lugs extending from the surface of the brake disk toward the wheel disk portion of the wheel. Tubular clamping sleeves pass radially through bores in the lugs into the arms and are retained in place by retainer pins extending parallel to the rotary axis of the wheel.

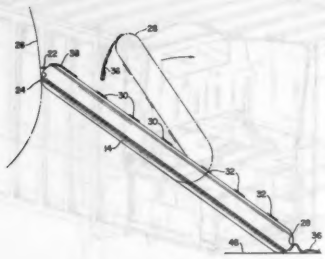
3,606,938
ROLLER ASSEMBLY WITH ONE-WAY BRAKING MEANS
Clarence A. Heyne, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Original application Jan. 5, 1968, Ser. No. 695,951, now Patent No. 3,503,490, dated Mar. 31, 1970. Divided and this application July 30, 1969, Ser. No. 870,855
Int. Cl. F16d 63/00
U.S. Cl. 188—82.1 4 Claims



An inclined power-driven conveyor of the type having a plurality of rotatable, article-transporting rollers positioned about chain-driven axles disposed transversely of

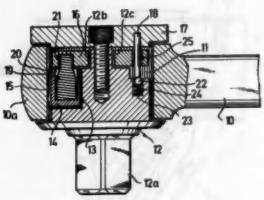
the conveyor, wherein a longitudinally-oscillatable pawl member and a ratchet member are enclosed within the respective rollers for restraining downwardly-directed rotation of the load-bearing surfaces of said rollers, and for allowing upwardly-directed free rotation of such roller surfaces.

3,606,939
INFLATABLE ESCAPE SLIDE
James R. Summer, Brielle, and Clarence S. Melander, Neptune, N.J., assignors to The Garrett Corporation, Los Angeles, Calif.
Filed Mar. 6, 1969, Ser. No. 804,867
Int. Cl. B65g *11/10*
U.S. Cl. 193—25 **7 Claims**



The lower half of the length of an inflatable escape slide is doubled back over and onto the top of the upper half and restrained thereat by hook and pile fasteners which are secured during an initial slide inflation stage until the beam members of the slide are nearly fully shaped, and which are then released to permit the lower half to swing upwardly, outwardly and then downwardly to rest, thus preventing tuck-under during inflation of the slide in a cross wind.

3,606,940
RATCHET SWITCHABLE INTO OPPOSITE DIRECTIONS OF OPERATION
Hans Joachim Finkeldei, Wuppertal-Nachstebreck, Germany, assignor to Firma Walter Finkeldei Werkzeugfabrik, Wuppertal-Wichlinghausen, Germany
Filed Jan. 5, 1970, Ser. No. 738
Claims priority, application Germany, Jan. 11, 1969, P 19 01 338.8
Int. Cl. F16d *11/06, 13/04, 23/00*
U.S. Cl. 192—43.1 **3 Claims**

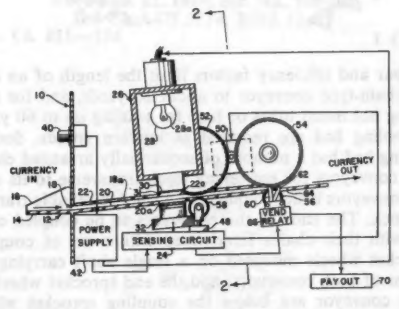


A ratchet switchable into opposite directions of operations for a screw operation of screws and nuts, which comprises a gripping part formed at its free end as a gripping handle, and forming at its other end a joint-bearing ring having inwardly extending teeth. A drive member is equipped with an axial coupling projection. A switching segment has outwardly extending teeth and is supported on a step-shaped secantial recess of the drive members which is provided as coupling member between the joint-bearing ring and the drive member. A switching cover, and a switch-over member are mounted on the drive member and operable by the switching cover by switching over in the sense of a change of operating direction. The switching-over member comprises a substantially annular sliding disc. A sliding block has oppositely disposed parallel guide edges and the sliding disc is linearly guided as an axial projection of the drive member in a direction crosswise to the longitudinal axis and full-faced supported outside of the sliding block on the drive member. The sliding block has on opposite points peripherally closed, axially directed receptacles for each coupling member connecting the switching cover with the sliding disc, as well as the latter with the switching segment, whereby the coupling member connecting the switching cover with the sliding disc is formed as an arresting pin passing through the sliding disc in an axially extending passing opening. The arresting pin is formed at its lower free end with a ball snapping device for the arresting of the working positions of the ratchet. The ball snapping device is received within a set step of a secantial recess of the drive body, while the coupling member connecting the sliding disc with the switching segment is formed as a switching joint having resilient rod characteristics self-elastic and return resilient crosswise to its longitudinal axis. The switching joint is received within an axial bearing receptacle on the side of the switching segment and in a recess provided in the sliding disc in axial direction of the bearing receptacle, respectively.

ERRATUM

For Class 193—25 see:
Patent No. 3,606,939

3,606,941
DOCUMENT VALIDATION APPARATUS
Jack E. Bayha, Chesterland, Ohio, assignor to Transmarine Corporation, Chesterland, Ohio
Filed July 11, 1969, Ser. No. 841,007
Int. Cl. G07f *1/06*
U.S. Cl. 194—4 **4 Claims**



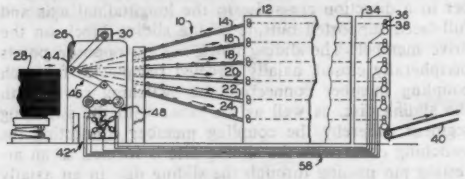
The invention relates to a slot-type document validation apparatus. The invention is characterized by having the document manually positioned into a testing area without the use of any trays, belts, or the like. Validation is accomplished by known techniques, and the document is then removed from the testing area upon proper validation with a positive removal system that eliminates the possibility of the document being removed from the testing area by any way other than the positive removal system, so that if the document is manually or otherwise restrained, the removal system will automatically reject the document and cancel the validation.

3,606,942

UNLOADER CONTROL FOR SHEET-CONVEYING APPARATUS

Curtice F. Daniels, 205 Pacific, Glendale, Oreg. 97442, and Curtice F. Daniels, Jr., 1311 NW. Hawthorne, Grants Pass, Oreg. 97526

Filed May 19, 1969, Ser. No. 825,627
Int. Cl. B65g 37/00
U.S. Cl. 198—20 12 Claims



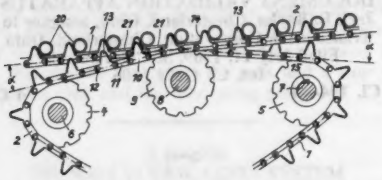
A multideck conveyor has a sequential deck feeder at one end and a sequential deck unloader at the other end. A variable speed drive between the feeder and the unloader varies the unloader timing speed in relation to the feeder timing speed so that the unloading end of the conveyor can discharge one length of material while the feeder feeds material of a different length to the conveyor decks.

3,606,943

CONVEYOR

Dietrich Grube, Ratingen-Tiefenbroich, Germany, assignor to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Filed Sept. 8, 1969, Ser. No. 855,903
Claims priority, application Germany, Sept. 16, 1968, P 17 77 173.2
Int. Cl. B65g 37/00
U.S. Cl. 198—102 12 Claims



Wear and efficiency factors limit the length of an endless chain-type conveyor to about 20 yards, and for conveying hot metal tubes or bars for cooling up to 60 yards of cooling bed are required at modern speeds. Such a cooling bed has a number of sequentially arranged chain-type conveyors for conveying stock transverse to its axis, the conveyors being coupled for a smooth reliable transfer of stock. The ends of the conveyors to be coupled overlap with their chains interleaved with a set of coupling sprocket wheels mounted on a single shaft carrying the chains of both conveyors; and the end sprocket wheels of each conveyor are below the coupling sprocket wheels and more distant from the centre of the conveyor than the coupling sprocket wheels.

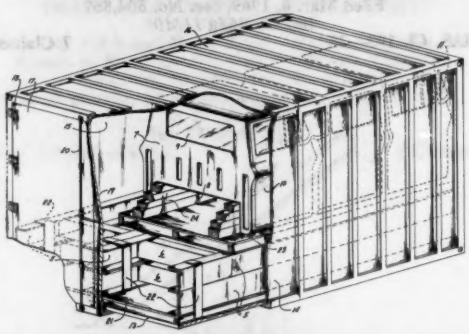
3,606,944

METHODS AND MEANS FOR PACKAGING VEHICLES IN LAND-SEA CONTAINERS

Robert T. Cadillac, 1110 E. 21st St., Brooklyn, N.Y. 11210

Filed June 9, 1969, Ser. No. 831,587
Int. Cl. B65d 85/68
U.S. Cl. 206—65R 23 Claims

A packaging system for the shipment of disassembled vehicles, such as buses and trucks, is provided in which a permanent, reuseable land-sea shipping container is utilized to package a plurality of disassembled vehicles. Provision is made for securing heavier components in load-supporting relationship to the deck of the container. In the case of flat-faced cowl and cowl-and-windshield type vehicles, there is secured to the deck of the container a stacked arrangement of vehicle frames of sufficient height to provide a protective area into which heavy components such as engines, transmissions, differentials and the like, can be completely inserted and secured. The remaining space within the container may be utilized to secure lighter components including stacked arrangements and cowls.



In the case of trucks with complete cabs, a preferred embodiment for packaging includes the packaging of four complete trucks by securing two pairs of superimposed frames in side-by-side relationship on the floor of the container. In this instance, at least some of the heavier components such as engines, transmissions, differentials and the like, are mounted within the vehicle cabs and the cabs, in turn, are mounted on and secured to the truck frames. Other parts of the disassembled vehicles such as tires, fenders and the like, are secured or nested between the side rails of the vehicle frames and in remaining areas of the container.

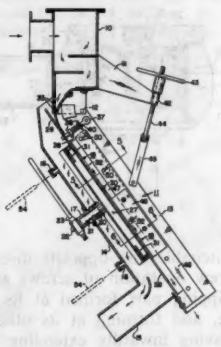
By utilizing the above arrangements, a number of complete vehicles can be packaged within a single land-sea container.

3,606,945

APPARATUS HAVING MOVABLE SIEVE FOR SEPARATING FLUENT MATERIAL

Orris L. Watson, Cleveland, and David L. Springston, Hudson, Ohio, assignors to Envirotech Corporation, Palo Alto, Calif.

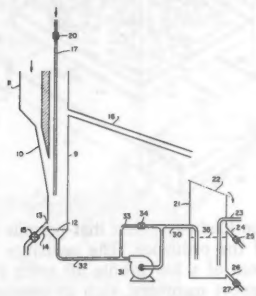
Filed Oct. 23, 1968, Ser. No. 769,975
Int. Cl. B07b 1/28
U.S. Cl. 209—251 10 Claims



Apparatus for separating fluent particulate material into separate portions by a sieve, wherein the sieve is

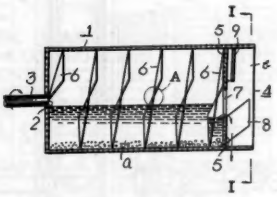
mounted for movement essentially in a plane so that, without disassembling the apparatus or even interrupting its operation it may be moved to present different portions of the sieve to the flow of material to equalize wear from abrasive fluent material and/or to make possible cleaning of the sieve if the fluent material tends to clog it.

3,606,946
METHOD FOR SEPARATING MACHINED COMPONENTS FROM SHAVINGS BY EBULLITION
Frederick A. Zenz and Fredric E. Zenz, both of Bryant Ave., Roslyn Harbor, N.Y. 11577
Filed Feb. 24, 1969, Ser. No. 801,399
Int. Cl. B03b *3/34*
U.S. Cl. 209—10 **2 Claims**



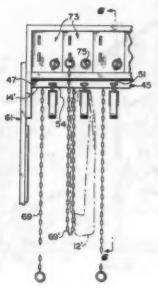
A method for separating manufactured components and pieces such as rivets, screws, and other precision components from shavings and chips produced in the machining operation by ebullition.

3,606,947
SUSPENSION CONCENTRATION-DEHYDRATING APPARATUS
Shigemasa Tanaka and Hidetomo Suzuki, Tokyo-to, Japan, assignors to Ebara Infilco Kabushiki Kaisha, Tokyo-to, Japan
Filed Sept. 5, 1969, Ser. No. 855,526
Claims priority, application Japan, Sept. 17, 1968, 43/80,594; Jan. 1, 1969, 44/3,265
Int. Cl. B01d *33/06*
U.S. Cl. 210—403 **3 Claims**



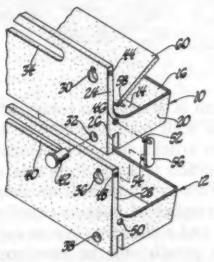
Proposed in the present invention is a concentration-dehydrator apparatus comprising means for precipitating the solids in the suspension, and means for separating and dehydrating the solids from the suspension and turning said solids into a cake-like mass by utlizing variation of properties of the suspended solids in a rotary cylindrical container and the difference of movements between the suspended solids and the liquid in said container, with no need of subjecting the precipitate to centrifugal separation, vacuum filtering or pressure filtering process.

3,606,948
GARMENT HANGER HARDWARE
Herman D. Strang, 308 Ridge St., Algonquin, Ill. 60102
Filed June 16, 1969, Ser. No. 833,271
Int. Cl. E05b *69/00*
U.S. Cl. 211—4 **4 Claims**



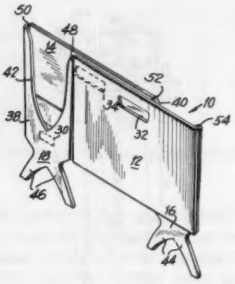
Metal saddle topped with a deep T for use with garment hangers is fabricated by joining identical halves in butting relationship. This hardware is particularly useful in maintaining position of a garment once hung, and prevents twisting of the hanger. In a preferred embodiment garment hangers improved in accordance with this invention are used in conjunction with an elongated flat bottomed channel having U-shaped cross section and having a T-shaped slot in a side wall of the elongated channel, with the bottom portion of the T slot extending across the bottom of the channel perpendicularly to the longitudinal axis of the channel to permit entry of the hardware into the U-shaped channel interior to reside on the bottom thereof.

3,606,949
TRANSPORTABLE STORAGE BIN ASSEMBLY
James E. Joyce, 878 Darien Circle, Rochester, Mich. 48063
Filed Feb. 11, 1969, Ser. No. 798,305
Int. Cl. A47f *3/14;* **B65d** *21/02*
U.S. Cl. 211—126 **1 Claim**



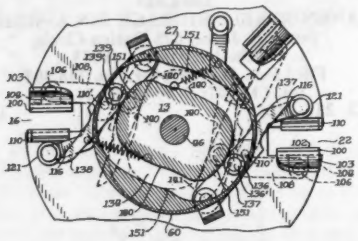
Storage bins or like articles, each having a storage compartment portion and an upstanding back member, are designed to be vertically stacked with the support member of one bin extending into a downwardly opening slot in another bin. To permit two or more such stacked bins to be carried as a unit means are provided for positively interconnecting the bins in the stacked array. Various embodiments are described in which the back member of one bin is positively connected to another bin in the stacked array.

3,606,950
SUPPORT STRUCTURE
Bela B. Nevai, Dobbs Ferry, N.Y., assignor to Nevco Wood Products Co., Inc.
Filed June 15, 1970, Ser. No. 46,143
Int. Cl. A47f 3/14
U.S. Cl. 211—132 7 Claims



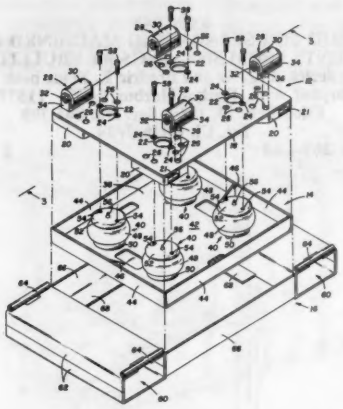
Support structure for magazines, and the like, which comprises side walls, end walls and a plurality of floor panels all hingedly interconnected so as to be foldable between a generally flat storage and/or shipping position and an open or erected position readily and easily whereat it will support magazines and the like in generally upright orientation.

3,606,951
ENVELOPE TURNOVER APPARATUS
Eugene Sather, Washington, and Lester H. Stocker, Phillipsburg, N.J., assignors to Bell & Howell Company, Chicago, Ill.
Filed Sept. 22, 1969, Ser. No. 859,830
Int. Cl. B65g 47/24
U.S. Cl. 214—1Q 5 Claims



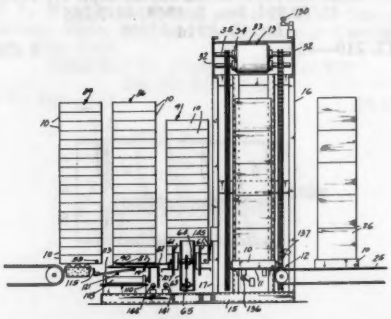
This invention is directed to rotary article turnover apparatus for use with mail handling or similar equipment for turning over articles such as envelopes from an address side down condition to an address side up condition. The turnover apparatus includes a drum shaped envelope carrier having a number of pockets equally spaced about its circumference and a clamping jaw at each pocket adapted for movement parallel to the envelope for holding the envelope without distortion while the carrier is successively cycled through an angle of 180°. The envelope carrier is supported for movement about a horizontal axis and is cycled and intermittently rotated through a given angle per operational cycle by a Geneva drive which is dimensioned so as not to interfere with movement of the envelope toward the carrier. Cam means including an integral cam track receiving a pair of cam followers is provided for opening and closing the clamping jaws during stationary portions of the operational cycle to release an envelope at a receiving station and for clamping and picking up an envelope at a supply station.

3,606,952
ORDNANCE LOADING SYSTEM
Harry S. Mankey, Dallas, Tex., assignor to Standard Manufacturing Co., Inc., Dallas, Tex.
Filed Mar. 24, 1969, Ser. No. 809,638
Int. Cl. B25j 3/00; B66f 3/18
U.S. Cl. 214—1D 10 Claims



An ordnance loading system that permits manual final positioning of the ordnance. The ordnance is supported on the lift boom of a low profile lift truck by a plurality of flexible support members, such as pneumatic springs, rubber shear pads, etc. The lift truck is operated to vertically and horizontally position the ordnance after which the position of the ordnance is manually finally adjusted against the action of the flexible support members.

3,606,953
STACKER FOR BOX-LIKE ARTICLES AND PALLET SUPPLY MEANS THEREFOR
Robert L. Beninger, Sheboygan, and Grant Hill, Jr., Elkhart Lake, Wis., assignors to H. G. Weber and Company, Inc., Kiel, Wis.
Filed July 31, 1969, Ser. No. 846,353
Int. Cl. B65g 57/06
U.S. Cl. 214—6P 10 Claims



Apparatus for stacking box-like articles and supplying pallets for stacking. Pallets are supplied to a vertically movable platform by a carriage, guided for reciprocable movement beneath a stack of pallets. Sprocket holding devices hold the pallets above the carriage and release the pallets one by one to the carriage. A pallet reserve station is provided behind a pallet supply station. An in-line pallet infeed station is provided behind the pallet reserve station. The carriage moves the last pallet at the pallet supply station onto the platform as it ejects a pallet having a

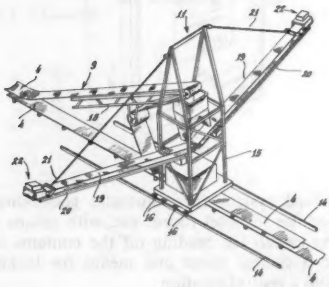
column of articles stacked thereon from the platform, and advances a stack of pallets to the pallet supply station, and a stack of pallets at the infeed station to the reserve station. Gripper arms at the reserve station hold the pallets above the carriage and accommodate reciprocable movement of the carriage and release the stack of pallets at the reserve station to the carriage for transfer to the pallet loading station. The carriage has puller arms engageable under a pallet at the infeed station, to pull a stack of pallets to the pallet reserve station as the pallets at the pallet reserve station are advanced to the pallet supply station.

3,606,954

CONTROL SYSTEM FOR STACKING EQUIPMENT

Gerald C. Mayer, Wayne, N.J., assignor to Hewitt-Robins Incorporated, Wayne, N.J.

Filed Nov. 24, 1969, Ser. No. 879,501
Int. Cl. B65g *57/00*
U.S. Cl. 214—10 **4 Claims**



A novel bed blending system is disclosed which produces uniform thickness layers in the bed. A conveyor feeds a conventional traveling stacking boom which deposits material on the bed as it travels. The bed is formed, layer by layer, on successive passes of the stacker. The control system monitors the feed rate and controls the stacker speed to provide for controlled layer thickness in the bed as conveyor speed and mass feed vary. The control system is so designed that a layer of the bed is uniform along the bed but is capable of providing variations in bed layer thickness from one layer to the next.

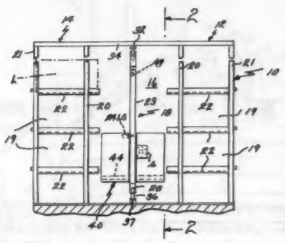
3,606,955

AUTOMATIC WAREHOUSING SYSTEM WITH MEANS CONTROLLING ELEVATOR MOVEMENT AND/OR LOAD CARRIER HORIZONTAL SPEED FOR STABILIZING LOAD CARRIER

Sanford Saul, Cleveland, Ohio, assignor to The Triax Company, Cleveland, Ohio

Filed Apr. 9, 1970, Ser. No. 26,964
Int. Cl. B65g *1/00*
U.S. Cl. 214—16.4A **16 Claims**

A warehousing system which includes an arrangement for preventing or materially reducing substantial stress and instability of a vertically elongated load carrier of the system, during horizontal stopping and/or starting of the load carrier mechanism. The powered load carrier may comprise vertically elongated horizontally movable mast structure with an elevator movable vertically with respect to the mast structure, for depositing loads into and removing loads from a storage rack. The load carrier is power driven by electric motors and is provided with a control system for controlling the movement of the load carrier components, and in one embodiment means are provided in the control system for preventing vertical movement of the elevator above a predetermined level with respect to the mast structure during horizontal movement of the mast structure. Likewise, during positioning movement of the elevator with respect to the mast structure above the predetermined level, the load carrier is positioned at a selected load handling position and is prevented from horizontal movement until such time as



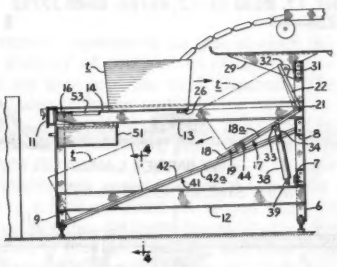
the elevator drops down to or below the predetermined level. In another embodiment, if the elevator has moved above the aforementioned predetermined level, during positioning movement, the control system is such that the load carrier is prevented from being actuated into high speed horizontal travel but instead is maintained at a reduced horizontal speed until such time as the elevator drops down to or below said predetermined level.

3,606,956

LOADING TABLE FOR USE WITH CONTINUOUS PRODUCTION OF WIENERS

William H. Neubeck, Jr., Justice, Ill., assignor to Bloomer-Fiske, Inc.

Filed July 29, 1969, Ser. No. 845,734
Int. Cl. B65b *69/00*
U.S. Cl. 214—300 **3 Claims**

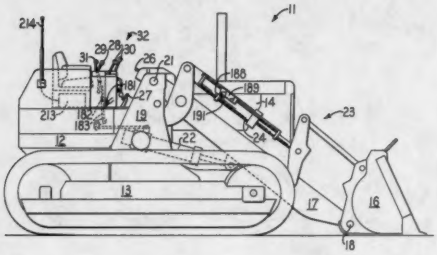


In an apparatus for continuous production of wieners, a loading table supports tubs for delivering strands of uncooked wieners to the intake of the processor. The table has a top with a series of bays or sections each for supporting tubs containing strands of wieners, one of the tubs of each bay being supported on a trap door portion of the top and serving to supply the processor. The strands in the tubs are joined so that when the tub on the trap door portion of each bay has emptied, the delivery to the processor proceeds from the adjacent tub. However, the trap door portion in each bay can be operated to lower the empty tub thereon to a slide below the table that returns the empty tub to the front of the table for reuse. When the trap door is returned, it provides a support for receiving the aforesaid adjacent tub.

3,606,957
REMOTE CONTROL SYSTEM FOR LOAD MANIPULATING VEHICLES

Joe E. Fuzzell, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 7, 1969, Ser. No. 822,368
Int. Cl. E02f *3/00*
U.S. Cl. 214—776 7 Claims

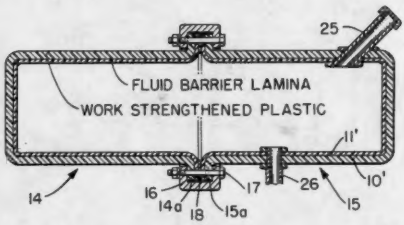


A crawler loader vehicle has remote control means capable of effecting intermediate settings of the operator's control linkages as well as extreme positions and provides for remotely initiating movement of the lift arms and bucket with automatic stopping at the intermediate position if desired. Hydraulic jacks, actuatable through radio controlled solenoid valves, are substituted for existing links in control lever linkages. The jacks perform as a conventional rigid link when the operator is situated on the vehicle and provide for the remote control if the operator's control levers are locked in fixed position.

3,606,958
LAMINATED FLUID-BARRIER CONTAINER AND METHOD OF MAKING IT

Paul M. Coffman, Cherry Hill, N.J., assignor to Shell Oil Company, New York, N.Y.

Filed May 17, 1968, Ser. No. 729,977
Int. Cl. B65d *85/72, 89/16;* B64d *37/02*
U.S. Cl. 220—63 8 Claims



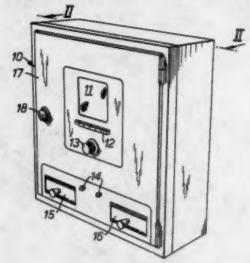
This application discloses a laminated fluid-barrier container and method of making it, particularly a container having a cold-work-strengthened fiber-oriented load-carrying plastic lamina or layer and another lamina or layer which forms a highly effective barrier against the passage of fluids, especially such fluids as oxygen and aromatic vapors. Such containers are especially suitable for foods, where oxygen entry causes spoilage, for gas tanks where vapor passage causes fuel loss and air pollution, and for similar uses.

The container body is formed by stretch-forming a laminated blank or workpiece in the solid-phase condition to cause cold-work-strengthening and fiber-orientation of the load-carrying lamina of the container and to stretch the fluid-barrier lamina along with the load-carrying lamina. Contact between laminae is assured by excluding air and using bonding material between laminae if desired.

3,606,959
DISPENSING MACHINE WITH REMOTE CONDITION INDICATOR

Charles Richard Paul Stonor, Haywards Heath, England, assignor to Sound Diffusion (Sales) Limited, Sussex, England

Filed Dec. 12, 1968, Ser. No. 783,217
Claims priority, application Great Britain, Dec. 21, 1967, 58,117/67
Int. Cl. G07f *11/00*
U.S. Cl. 221—2 16 Claims

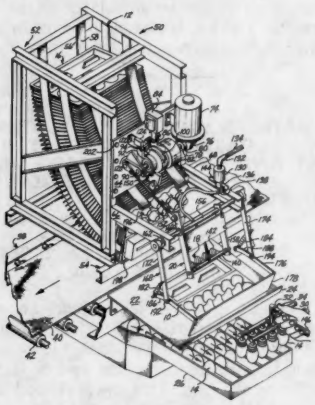


A centralised system for automatic goods-dispensing machines for use in hotel rooms etc. with means including a sliding switch for reading off the contents of each machine on a central meter and means for locking any machine from a central location.

3,606,960
EGG CARTON DISPENSING MACHINE

Lyle J. Butterworth, Tacoma, Wash., assignor to National Poultry Equipment Company, Benton, Wash., a division of Dawson & Co., Inc., Tacoma, Wash.

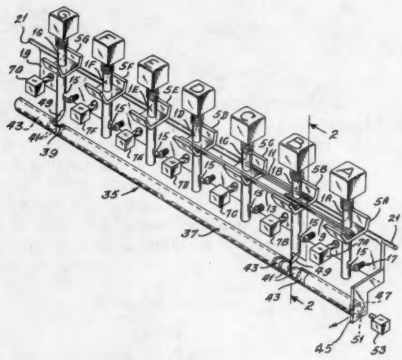
Filed Mar. 3, 1969, Ser. No. 803,777
Int. Cl. B65h *3/08*
U.S. Cl. 221—211 6 Claims



For chicken flock owners and operators and others marketing eggs, who have a need for many automatic egg processing and handling products and accessories, an egg container dispenser and dispensing method are provided to rapidly position a carton, flat or other egg

package on a tray or counter to be quickly filled with clean graded eggs. Egg containers, generally purchased and delivered in nestled stacks, are so placed in a dispenser and guided to a distribution location where they are stopped. When needed, the egg containers are conveniently released and pulled away from the nestled stack into their loading position, one at a time, by utilizing a cam operated indexing stack holding means and a cam timed vacuum container gripping means that is incorporated into a powered cam sequenced linkage means. Additional optional cam operated linkage moves a filled egg container to a distribution conveyor as another egg container is being released and separated from the nestled stack. At all times the vacuum gripping means and method are particularly suited to handling cartons made from plastic materials.

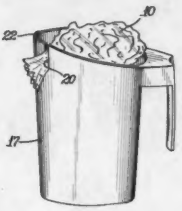
3,606,961
VENDING MACHINE SELECTION AND CONTROL
Alan M. King, 4746 The Boulevard, Westmount, Quebec, Canada
Filed Sept. 10, 1969, Ser. No. 856,585
Int. Cl. B67d *5/06*
U.S. Cl. 222—76 **13 Claims**



A selection and control mechanism for a vending machine in which a primary liquid is dispensed as well as various additives selected by the customer. The mechanism includes a primary selector which is normally blocked from shifting by a release device controlled by a latching device. When the latching device moves to its latching position, it also moves the release device such that the selector can be depressed, and it further holds the selector in its depressed position. As the selector moves to its depressed position, it actuates a primary switch. Secondary selectors are also provided and they operate secondary switches when depressed. The latching means also holds the secondary selectors in their depressed positions. The primary selector can be depressed independently of the secondary selectors. Each secondary selector when depressed carries the primary selector along with it and may, likewise, carry another secondary selector along with it.

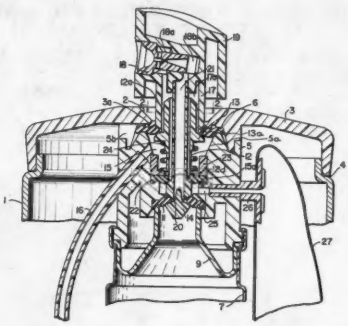
3,606,962
DISPENSING AND SEALING RECEPTACLE
William R. Scholle, Long Beach, Calif., assignor to Scholle Container Corporation, Northlake, Ill.
Filed Sept. 5, 1969, Ser. No. 855,592
Int. Cl. B65d *35/56*
U.S. Cl. 222—105 **3 Claims**

A pouring pitcher for supporting and dispensing fluent contents of a bag of film material and for closing the bag after it has been opened and part of the contents dispensed, comprising a slot in the wall of the pitcher opening to



its upper edge into which the opened end of the bag can be wedged to effect a closure.

3,606,963
AEROSOL DISPENSER FOR DISPENSING A MULTICOMPONENT PRODUCT
Jean Marand, Norwalk, Conn., assignor to Geigy Chemical Corporation, Greenburgh, N.Y.
Filed July 3, 1969, Ser. No. 839,009
Int. Cl. B65d *83/06;* **B67d** *5/52*
U.S. Cl. 222—132 **14 Claims**

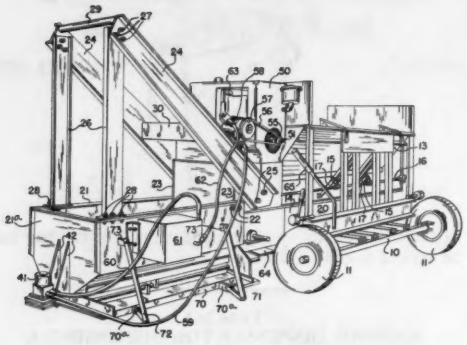


An aerosol dispenser of the type in which the propellant and a plurality of components of the product to be dispensed are kept separate until dispensed. The dispenser has an outer container with a valve means on said outer container. A propellant cartridge is provided in said outer container and is coupled to said valve means. At least one fluid tight flexible sac is provided in said outer container and contains one component of the product to be dispensed in a fluid condition. A second component can be contained in either the outer container or a second flexible sac. Means is provided coupling said outer container and sac or sacs to said valve means for aspirating the components when the valve means is opened to allow propellant to flow from said propellant cartridge.

3,606,964
GRAVEL SPREADER
Earl H. Ensinger, 833 E. 139th St., Cleveland, Ohio 44110
Filed Aug. 28, 1969, Ser. No. 853,789
Int. Cl. B65g *65/70*
U.S. Cl. 222—161 **6 Claims**

A hopper and conveyor unit adapted to receive gravel or the like from a hauling truck has an endless conveyor extending crosswise of the roadway and effective to deliver gravel from the hopper to a box extending crosswise over the shoulder of the roadway, this box having a perforated bottom with means for reciprocating the per-

forated bottom whereby the gravel is evenly shaken out upon the shoulder, together with a control gate for varying the number of perforations in the bottom free to discharge gravel.



3,606,965

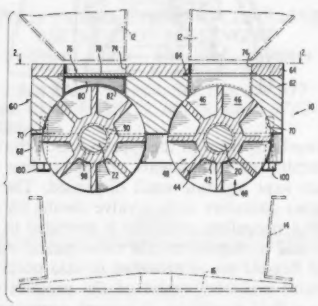
DISPENSER FOR PARTICULATE AND PULVERULENT MATERIAL

Charles E. Cortelyou, Little Silver, Michael Scaduto, North Arlington, and Pacquale C. La Rosa, North Brunswick, N.J., assignors to Turf-O-Matic, Inc., Oceanport, N.J.

Filed Dec. 23, 1968, Ser. No. 786,052

Int. Cl. G01f *11/06*

U.S. Cl. 222—312 **5 Claims**



A dispenser particularly for use with lawn combines, which dispenses seeds and fertilizers by means of rotating, compartmented, cylindrical drums. The amount of material to be dispensed by the device can be accurately controlled by the number of compartments on the cylindrical drum that is exposed to the reservoir of materials.

3,606,966

AEROSOL DISPENSER

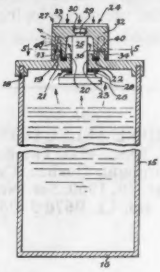
Joseph M. Rait, Buffalo, N.Y., assignor to Pelorex Corp., Buffalo, N.Y.

Filed June 6, 1969, Ser. No. 831,115

Int. Cl. B65d *83/06*

U.S. Cl. 222—402.11 **7 Claims**

A dispenser for aerosol containers comprising a container end wall member having a bore therethrough and a pair of upstanding annular radially spaced rims at the outer surface of the end wall member concentric with the bore. An auxiliary resilient sealing member is disposed in the annular groove between the rims. A shank extends through the bore and is provided with an operating member at its outer end having an annular portion in sealing contact with the sealing member. The inner end of the shank is provided with a valve which seats against a primary resilient sealing member interposed between the valve and the inner surface of the end wall member.



The operating member has a pair of depending locking posts which normally engage the top surface of the outer rim of the end wall member to prevent actuation of the valve. The operating member is rotatable to bring the locking posts into registry with corresponding recesses in the outer rim to permit depression of the operating member against the resilient resistance of the auxiliary sealing member and thereby unseat the valve to effect dispensing of the aerosol contents around the shank and through a discharge opening in the operating member.

3,606,967

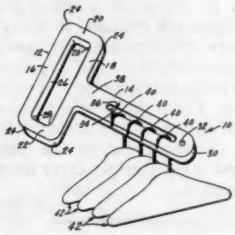
HANGER HANDLE

Toulman V. Roberts, 8909 Lakehurst, Oklahoma City, Okla. 73120

Filed Mar. 28, 1969, Ser. No. 811,373

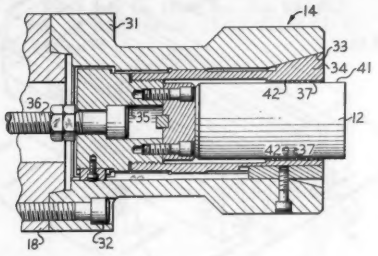
Int. Cl. A47g *25/06*

U.S. Cl. 224—45T **10 Claims**



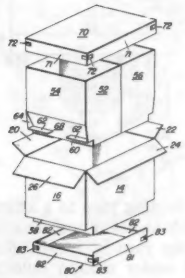
A hanger handle to carry a plurality of clothes-hangers in an over-the-shoulder manner wherein the garments are oriented to optimally distribute the weight thereof, and wherein the hanger handle is constructed to permit the individual using the device to have his arm and hand in the maximum comfort and strength position.

3,606,968
FRICTION WELDING CHUCK ASSEMBLY
Calvin D. Loyd, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed May 1, 1969, Ser. No. 821,053
Int. Cl. B23k 27/00
U.S. Cl. 228—2 15 Claims



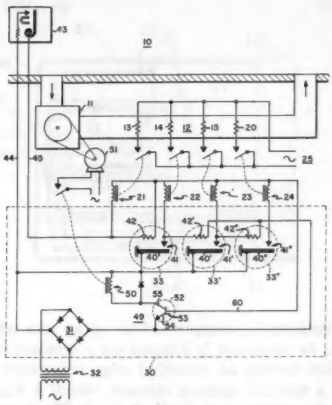
A chuck assembly within a friction welding machine for securing one of a pair of weld pieces which are relatively rotated and urged into axial engagement to bond them together at a common interface. With at least one of the weld pieces having a relatively high-finished surface subject to marring, a chuck assembly for securing the one weld piece includes a chucking member generally conforming with the surface of the weld piece. Elastomeric material of selected thickness is arranged upon the chucking member to engage the weld piece to prevent contact between the weld piece and chucking member, while precisely controlling axial, radial and rotational alignment of the weld piece within the chucking member.

3,606,969
SHIPPING AND DISPENSING CONTAINER
Joseph Voytko, Lakewood, Ohio, assignor to Westvaco Corporation, New York, N.Y.
Filed Jan. 26, 1970, Ser. No. 5,588
Int. Cl. B65d 19/20
U.S. Cl. 229—37E 21 Claims



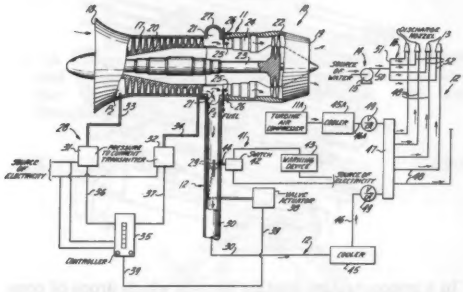
A composite shipping and dispensing package is disclosed which includes an outer container having a novel, integral lower end configuration for accommodating industrial truck handling devices without the need for auxiliary pallet structures. The package also includes a novel inner container construction to insure complete and unrestricted unloading through an instant dispensing bottom closure.

3,606,970
CONTROL DEVICE FOR A PLURALITY OF STAGES OF ELECTRIC HEAT WITH CURRENT RESPONSIVE MEANS FOR CONTROLLING A FAN
Arlon D. Kompelien, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Sept. 3, 1969, Ser. No. 854,978
Int. Cl. H05b 1/02
U.S. Cl. 236—11 8 Claims



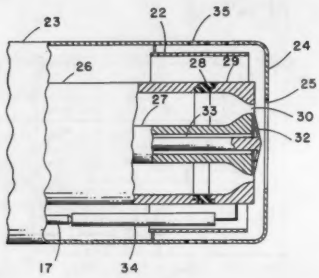
A control apparatus for controlling a plurality of stages of electric heat in sequence in response to a space thermostat and for controlling a fan for delivering heated air to the space when any one of the electric heaters is energized. The control of the fan is accomplished by a current responsive device responsive to the flow of current to any one of a plurality of actuators for energizing the electric heating stages.

3,606,971
GAS TURBINE AIR COMPRESSOR AND CONTROL THEREFOR
Emmett S. Harrison, Corona, N.Y., and August H. Zoll, Cedar Grove, and Chapman J. Walker, Saddle River, N.J., assignors to Curtiss-Wright Corporation
Filed May 28, 1970, Ser. No. 41,509
Int. Cl. A01g 15/00; E01h 13/00
U.S. Cl. 239—14 14 Claims



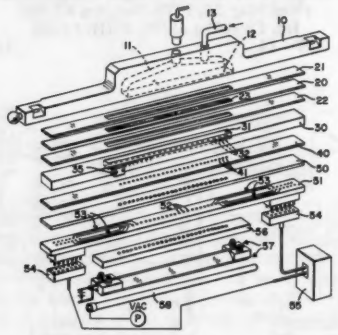
An artificial snow producing system employing a novel gas turbine air compressor which has an air by-pass connected to discharge nozzles to deliver compressed air to the latter for co-mingling with water to generate snow-like water particles. The gas turbine compressor is provided with an overload prevention system to avoid excess by-pass of compressed air and the consequent overheating and failure of the combustor and turbine components of the gas turbine compressor.

3,606,972
SPRAY COATING APPARATUS
Wolfgang Ferrant, Bozen, Italy, assignor to Ransburg Electro-Coating Corp., Indianapolis, Ind.
Continuation of application Ser. No. 632,583, Apr. 21, 1967. This application May 12, 1969, Ser. No. 826,071
Claims priority, application Germany, Apr. 28, 1966, F 49,044
Int. Cl. B05b *5/00*; F23d *11/28*
U.S. Cl. 239—15 15 Claims



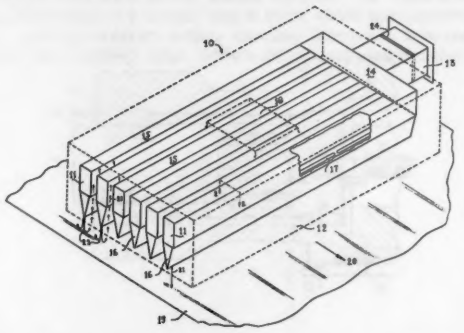
An electrostatic, compressed-air spray gun wherein the liquid to be atomized is formed on a conductive support into a film having an extended edge coincident with one edge of a narrow opening through which a high-velocity stream of atomizing air is discharged. The opposite edge of such opening is defined by an electrode between which and the film-support there is maintained an electrical potential difference. The gun may be provided with an insulated spray-surrounding electrode which is maintained at an effective spray-repelling potential by the transmission of ion-borne charges to or from it.

3,606,973
FILTER PLATE FOR A COATING HEAD
Gerald T. Davis, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio
Filed Nov. 17, 1969, Ser. No. 877,251
Int. Cl. B05b *5/00*
U.S. Cl. 239—15 8 Claims



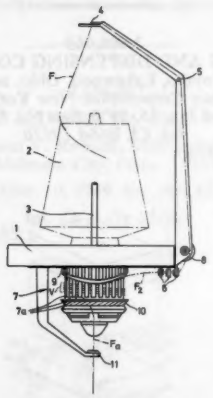
In a noncontacting coating head in which drops of coating are ejected from very small orifices in an orifice plate toward a web or other article being coated, a filter plate having perforations therein no larger than the orifices is mounted directly in the coating head just upstream of the orifice plate to remove from the coating material any particles of a size sufficient to clog the orifices. The total open area of the perforations is greater than the total open area of the orifices so that an appreciable number of perforations can be blocked by foreign particles without seriously affecting operation of the coating head.

3,606,974
MATERIAL TREATING APPARATUS
Nelson M. Steele, 1762 Townline Ave., Beloit, Wis. 53511
Filed Apr. 4, 1969, Ser. No. 813,635
Int. Cl. A62c *31/10*
U.S. Cl. 239—568 5 Claims



A nozzle assembly for treating materials by impingement of a high velocity gaseous medium comprising a plenum chamber and a generally triangularly shaped nozzle attached to said plenum chamber and communicating therewith.

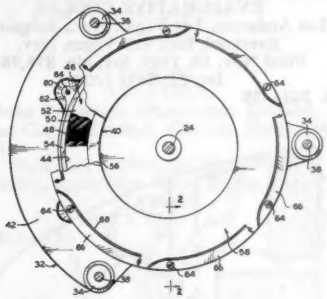
3,606,975
METHOD OF FEEDING YARN TO A KNITTING PLACE ON A TEXTILE MACHINE
Karl Isac Joel Rosen, Villa Haga, Ulricehamn, Sweden
Filed Jan. 9, 1970, Ser. No. 1,635
Claims priority, application Germany, Jan. 22, 1969, P 19 03 133.5
Int. Cl. B65h *51/20*
U.S. Cl. 242—47.12 1 Claim



A method of feeding yarn to a knitting place on a textile machine, such as a knitting, weaving or winding machine, wherein the yarn is drawn off a bobbin and tangentially wound under tension onto a storing drum in the form of a plurality of windings. The yarn at the winding-on stage bears against a free surface section of the storing drum being moved in the axial direction of the storing drum by pressure at least on the last formed winding by means of a sliding element which is movable in the longitudinal direction of the surface of the drum and/or forms an acute angle between itself and the outer face of the said drum at least over part of the drum periphery and finally being withdrawn from the storing drum in an axial direction. An irregular ball of yarn having one or more layers at least in parts is formed by reducing the

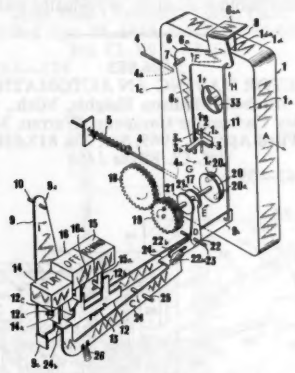
winding tension of the yarn relative to the winding tension to be maintained in a one-layered winding as a result of the pressure which is effective in an axial direction.

3,606,976
BRAKE FOR TAPE REEL
Clarence T. Lewis, Portland, Oreg., assignor to Data Pacific Corporation, Portland, Oreg.
Filed July 10, 1969, Ser. No. 840,802
Int. Cl. B65h *59/38, 63/02;* G11b *15/32*
U.S. Cl. 242—190 10 Claims



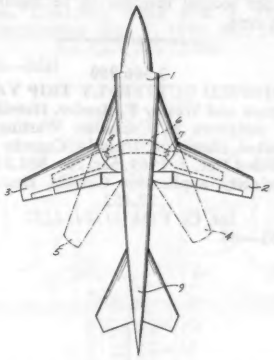
A brake for a tape reel includes a stationary brake shoe disc adjacent the tape reel wherein the brake shoe disc is provided with spring-mounted tabs for normally urging the brake shoe disc against the reel. An annular electromagnet is mounted in juxtaposition with the tape reel on the opposite side of the brake shoe disc therefrom and is employed for moving the brake shoe disc away from the reel.

3,606,977
DEVICE FOR WINDING AND REWINDING FILM IN A CARTRIDGE TYPE PROJECTOR
Tokusaburo Kakiuchi and Hideaki Akiyama, Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan
Filed July 15, 1969, Ser. No. 841,798
Claims priority, application Japan, July 17, 1968, 43/50,348
Int. Cl. G03b *1/04;* G11b *15/32, 23/04*
U.S. Cl. 242—200 2 Claims



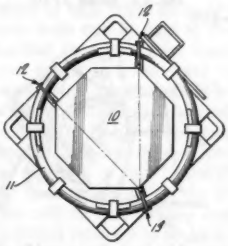
A cartridge type movie projector having a cartridge movable between projection and rewinding positions. Depression of a projection button energizes the film drive and upon termination a signal lever releases the cartridge to move it to rewind position. Depression of the stop button during projection disengages the projection button, deenergizes the film drive and also provides for the cartridge to move to rewind position where the projection button cannot be engaged for actuation.

3,606,978
WING SWEEP PIVOT-BEARING ARRANGEMENT
Philip C. Whitener, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Oct. 16, 1969, Ser. No. 866,867
Int. Cl. B64c *3/40*
U.S. Cl. 244—46 13 Claims



An aircraft having movable wings with a wing pivot apparatus which eliminates major axial forces on the bearings is described. Two spherical bearings are utilized for each wing with the spherical bearings having their center on the pivot axis of the wing. The bearings are oriented with their norminal axes noncoincident with the pivot axis of the wing so that a plane passing through the center of the upper bearing perpendicular to the nominal axis thereof will intersect a plane passing through the center of the lower bearing perpendicular to its nominal axis at the approximate center of lift of the wing. The pivot bearing design reduces axial forces and present essentially only radial shear forces upon the individual bearing elements. The wing pivot apparatus is preloaded to prevent loosening of the bearing apparatus during normal operational use of the aircraft. The bearings permit any necessary thermal expansion of the wing pivot apparatus and are covered with a low-friction polymeric material to improve bearing life and decrease friction.

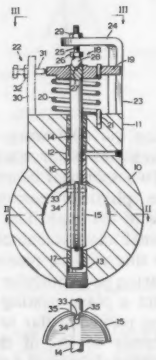
3,606,979
EXPANSIBLE SUPPORT MEANS
T. O. Paine, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Robert M. Norman, Glendale, and Gerrit Steenhagen, Montrose, Calif.
Filed Oct. 6, 1969, Ser. No. 864,020
Int. Cl. F16m *1/00*
U.S. Cl. 248—14 5 Claims



A base support for providing an expansible and contractible coupling between two members is disclosed, having a pair of laterally movable mounts and a rigid

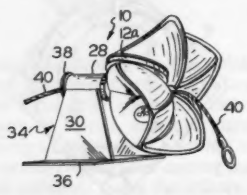
mount circumferentially spaced about a support ring comprising the first member. Each movable mount includes a four bar linkage arrangement in which the top horizontal bar is connected to the supported second member. The rigid mount is also connected to the supported second member, with the four bar linkage arrangements being oriented in such a manner that the axes of their respective lateral movements intersect the rigid mount. As a result, the movable mounts compensate for the thermal contraction and expansion of either of the members while still permitting the second member to be rigidly secured to the support ring.

3,606,980
MODIFIED BUTTERFLY TRIP VALVE
James Simpson and Wesley F. Reeder, Hamilton, Ontario, Canada, assignors to Canadian Westinghouse Company Limited, Hamilton, Ontario, Canada
Filed Dec. 1, 1969, Ser. No. 881,245
Claims priority, application Canada, Dec. 11, 1968, 37,482
Int. Cl. F16k *31/44, 1/22*
U.S. Cl. 251—66 **3 Claims**



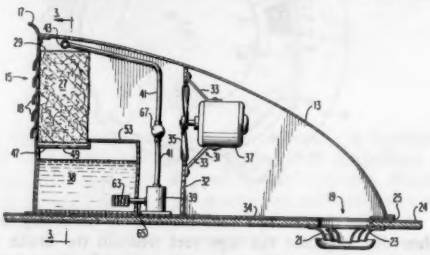
The invention is a butterfly valve for use in turbine emergency shutdown. Conventional butterfly valves would jam at the temperatures and pressures involved. This valve is arranged to remain partially open in the shut-off position, the valve disc is slidable on the valve shaft to prevent galling with the valve passage and the disc is relieved adjacent the shaft bushings. These features, combined with an anti-thrust bearing for the shaft ensure reliable operation.

3,606,981
FAIRLEAD ASSEMBLY
Curtice F. Daniels, 305 Pacific, Glendale, Oreg. 97442, and Curtice F. Daniels, Jr., 1311 NW. Hawthorne, Grants Pass, Oreg. 97526
Filed July 22, 1969, Ser. No. 843,668
Int. Cl. B66d *1/36*
U.S. Cl. 254—190 **9 Claims**



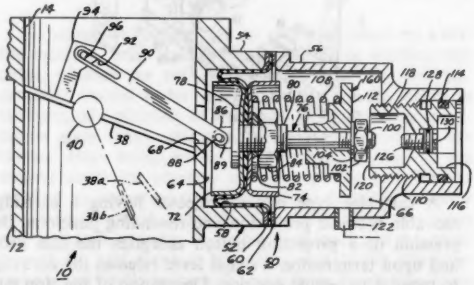
A fairlead assembly includes a guide sleeve and plural sheaves mounted for revolving movement about the axis of the sleeve. The sheaves are symmetrically arranged about a projection of the longitudinal axis of the sleeve with their rotational axes extending normal to the axis of the sleeve so that they converge to define a small central opening through which a cable leads towards a load. The invention includes crowned lines guides which extend between adjacent sheaves and have convexly curved outer surfaces. When a cable under tension extends across one of such surfaces, it tends to force the cable toward the closest sheave and revolve the sheave assembly to seat the cable in such sheave.

3,606,982
EVAPORATIVE COOLER
Les Anderson, Las Vegas, Nev., assignor to Everkool, Inc., Las Vegas, Nev.
Filed Nov. 10, 1969, Ser. No. 875,084
Int. Cl. B01f *3/04*
U.S. Cl. 261—29 **13 Claims**



This disclosure relates to a roof top evaporative cooler for cooling the interior of vehicles such as campers and trailers, whether the vehicle is moving or stationary. The unit includes a rear facing streamlined housing disposed over a roof top register, with a wind deflector such as a spoiler for directing the air stream passing over the unit into a louvered entrance port. A suction fan is disposed within the housing between the entrance port and the register for pulling air into the housing, through an evaporative pad and for expelling the cooled air, guided by the configuration of the housing, through the register and into the vehicle. The cooling medium is pumped from a supply tank to a distributor over the pad and collected after it passes through the pad for recirculation. The supply tank may be either incorporated within the cooler housing or externally disposed thereto and mounted on the vehicle body. The pad is constructed from a suitable porous material and the cooling medium is typically water.

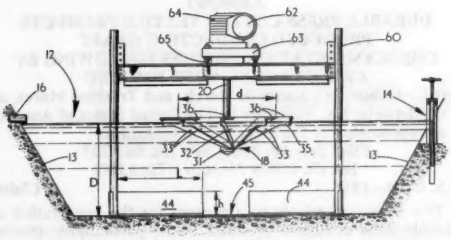
3,606,983
CARBURETOR HAVING AN AUTOMATIC CHOKE
Robert D. Mitchell, Madison Heights, Mich., assignor to Holley Carburetor Company, Warren, Mich.
Filed Apr. 21, 1969, Ser. No. 817,636
Int. Cl. F02m *1/08*
U.S. Cl. 261—39 **12 Claims**



A carburetor, having a choke valve with thermostatic means adapted to urge the choke valve in the closing di-

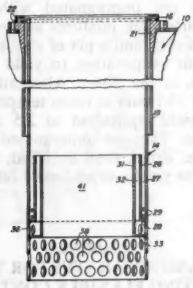
rection when cold, is provided with pressure responsive means which communicates with a source of engine vacuum for moving the choke valve in a direction opposite to that of the thermostatic means upon engine starting; the degree of effective communication between the pressure responsive means and the source of engine vacuum is controlled in accordance with the position of the carburetor throttle valve in order that the pressure responsive means will be effective for moving the choke valve to a first partly opened position when the throttle valve is in its nominally closed position and to a variable second more fully opened position when the throttle valve is moved to a part throttle position.

3,606,984
AERATION
William Swan Robertson, Manchester, England, assignor to Simon-Carves Limited, Cheadle Heath, Stockport, England
Filed May 9, 1968, Ser. No. 727,802
Claims priority, application Great Britain, May 17, 1967, 22,936/67
Int. Cl. C02c *1/10*
U.S. Cl. 261—91 **11 Claims**



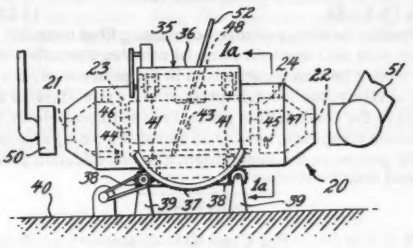
Surface aeration apparatus for treating effluent liquid in which baffle plates are mounted below a rotatable surface aerator and are arranged to oppose any tendency for the effluent liquid to be rotated as a body with the aerator.

3,606,985
APPARATUS FOR CONTROLLING THE FLOW OF GASES
Robert D. Reed, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.
Filed Apr. 30, 1969, Ser. No. 820,446
Int. Cl. B01d *47/02*
U.S. Cl. 261—124 **4 Claims**



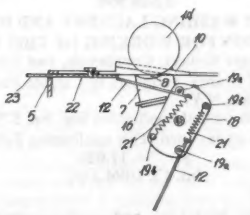
Apparatus for controlling the flow of a gaseous medium wherein baffles within a tubular member form separate chambers for receiving the gaseous medium each having its own exit ports which are at different locations below the level of a quantity of liquid and provide for the progressive release of the gaseous medium from the respective chambers for bubbling through the liquid without significantly disturbing the liquid below the level where the gas is flowing through the exit ports.

3,606,986
COPPER-REFINING APPARATUS AND THE LIKE
William B. Greenberg, 1510 Brinton Park Drive, Wynnewood, Pa. 19096
Original application Feb. 5, 1968, Ser. No. 702,973, now Patent No. 3,561,952, dated Feb. 9, 1971. Divided and this application Aug. 7, 1970, Ser. No. 61,986
Int. Cl. C22b *15/06*
U.S. Cl. 266—36H **7 Claims**



This invention is especially concerned with apparatus for the production of refined copper from scrap and/or other impure copper having high lead and/or tin content wherein slag formers may be selected from compounds of borates, silicates, phosphates and alkali oxides.

3,606,987
TABLE TENNIS TRAINING DEVICE
Yoshiro Nomura, 17–5, 2-chome, Kuramae, Taito-ku, Tokyo, Japan
Filed Aug. 10, 1970, Ser. No. 62,289
Claims priority, application Japan, Apr. 22, 1970, 45/34,529
Int. Cl. A63b *39/00*
U.S. Cl. 273—30 **5 Claims**



A table tennis training device comprises a table tennis board which inclines moderately down toward the place behind the center of said board, a shooting means installed at the center of said board so as to shoot intermittently table tennis balls one by one to the front of said board, and a backnet or a backsheet standing up on the rear brim of said board so as to ward balls which are struck back by a racket of a trainee. Said balls fall on said board, roll down toward the place behind the center of said board and are led into the shooting means. The shooting means comprises a motor-driven rotatable member which pivotally supports a pair of 180°-spaced and spring-biased ball striking plates. As the member rotates, the tip of a plate will be temporarily restrained to tension its spring and then released to strike a ball. The balls are automatically lifted one at a time from a supply source into position to be struck by a released plate. Therefore, the trainee may alone train on the table tennis without an opponent by employing this device.

CHEMICAL

3,606,988

PROCESS FOR DYEING NITROGEN-CONTAINING FIBRE MATERIALS

Klaus Walz, Leverkusen-Wiesdorf; Mathieu Quaedvlieg, Opladen, and Manfred Baecker, Blecher, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 30, 1968, Ser. No. 748,647
Claims priority, application Germany, Apr. 8, 1967, F 53172 IVc/8m
Int. Cl. D06p *3/14*
U.S. Cl. 8—54 11 Claims

Process for dyeing nitrogen-containing fiber materials, e.g., wool, with acid dyestuffs or metal complex dyestuffs wherein the dyeing process is carried out in the presence of, as a dyeing auxiliary, the reaction product of (1) an alkylene oxide and (2) the condensation product of (a) formaldehyde, (b) a phenolic compound, and (c) an amine containing at least two —NH groups; or the quaternization or esterification products of said reaction product (2).

ERRATUM

For Class 431—2 see:
Patent No. 3,607,791

3,606,989

FABRIC-TREATING COMPOSITION AND METHOD

William J. Park, Hacienda Heights, Calif., assignor to Purex Corporation, Ltd., Lakewood, Calif.

Filed Oct. 19, 1967, Ser. No. 676,634
Int. Cl. D06l *3/08, 3/12*
U.S. Cl. 8—108 3 Claims

Fabrics are increased in brightness by deposition thereon of particulate synthetic organic polymer of a size to be suspendible in dilute aqueous solution of sodium hypochlorite, conveniently during an otherwise conventional fabric washing operation.

3,606,990

PROCESS FOR WASHING LAUNDRY AND DETERGENT COMPOSITION FOR WORKING OF THIS PROCESS

Michel Rene Roger Gobert, Courbevoie, and Gerard Mouret, Paris, both of France, assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of application Ser. No. 579,491, Sept. 15, 1966, now abandoned. This application Feb. 12, 1970, Ser. No. 11,028
Int. Cl. D06l *3/02*
U.S. Cl. 8—111 24 Claims

A process for bleaching and washing which comprises treating a stained cloth or the like with an aqueous solution containing a water-soluble peroxide bleaching agent said treatment being carried out in the presence of a compound capable of inhibiting enzyme-induced decomposition of said bleaching agent.

3,606,991

PROCESS FOR PREPARING WASH-WEAR AND DURABLE PRESS COTTONS WHICH WILL ABSORB OPTICAL BRIGHTENERS FROM LAUNDRY DETERGENTS UNDER HOME LAUNDRY CONDITIONS

Robert J. Harper, Jr., Metairie; Gloria A. Gautreaux, New Orleans; Eugene J. Blanchard, New Orleans, and Joseph S. Bruno, Chalmette, all of La., assignors to The United States of America as represented by the Secretary of Agriculture

Filed Dec. 18, 1968, Ser. No. 784,939
Int. Cl. D06m *9/00*
U.S. Cl. 8—115.6 4 Claims

Process for preparing a cross-linked cellulosic fabric capable of repeatedly absorbing optical brighteners from wash solution, comprising contacting the said fabric with an aqueous solution comprising a cross-linking agent, about 5–15 weight percent of an alkylpolyethylene oxide alcohol or glycol and thereafter curing the fabric.

3,606,992

ABRASION AND WRINKLE RESISTANT COTTON CONTAINING FABRIC AND METHOD OF MANUFACTURE

William E. Aldrich, Cranston, R.I., assignor to Warnaco Inc.

Filed Aug. 28, 1967, Ser. No. 663,553
Int. Cl. D06m *13/34*
U.S. Cl. 8—115.6 7 Claims

A method for treating cotton containing fabric for obtaining improved wrinkle-resistance and improved abrasion resistance whereby the fabric is padded through a resin finishing bath containing a mixture of a thermosetting resin and a latex emulsion, is partially dried, and is cured at elevated temperature.

3,606,993

DURABLE PRESS COTTON TEXTILE PRODUCTS PRODUCED CONDUCTING GRAFT COPOLYMERIZATION PROCESS FOLLOWING BY CROSS-LINKING WITH DMDHEU

Jett C. Arthur, Jr.; James A. Harris, and Trinidad Mares, all of Metairie, La., assignors to The United States of America as represented by the Secretary of Agriculture

Filed July 18, 1969, Ser. No. 843,237
Int. Cl. D06m *15/36, 15/72, 13/42*
U.S. Cl. 8—116 2 Claims

This invention relates to a process for the preparation of durable-press cellulosic products. More particularly, this invention relates to a multistep process for the preparation of durable-press cellulosic products by a free radical initiated graft copolymerization process followed by a normal cross-linking process to yield products with high wash-wear ratings and high wrinkle recovery angles.

3,606,994

PROCESS FOR FINISHING COTTON WITH CARBAMATE CROSSLINKING AGENTS FORMED IN SITU IN THE FIBERS

Norton A. Cashen, Metairie; Robert M. Reinhardt, New Orleans, and John D. Reid, New Orleans, all of La., assignors to The United States of America as represented by the Secretary of Agriculture

Filed July 23, 1969, Ser. No. 844,166
Int. Cl. D06m *13/14, 13/40*
U.S. Cl. 8—116.3 3 Claims

Cotton fabrics are impregnated with aqueous formaldehyde-methyl carbamate mixtures at molar ratios of about 2:1 to 4:1 respectively, and a pH of about 10, then heated in a package without evaporation to yield dimethylol methyl carbamate in situ in the fibers. Alternatively, the package, could be held for 16 hours at room temperature. The adduct is produced in yield equivalent to 2.5 to 10% dimethylol methyl carbamate. The wet impregnated fabric is removed from the package, dried, then acidified, and catalyst is applied. It is cured to yield a cross-linked fabric having durable press properties.

3,606,995

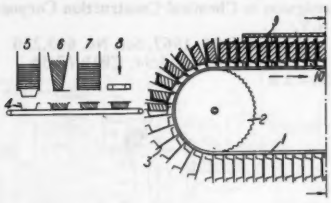
PROCESS AND APPARATUS FOR THERMALLY TREATING FLEXIBLE CONTAINERS

Nico Jacobus August van den Hemel, Zevenaar, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,740
Claims priority, application Netherlands, Dec. 13, 1967, 6716919
Int. Cl. A61l *3/00*
U.S. Cl. 21—2 5 Claims

A process and apparatus for the sterilization or other ther-

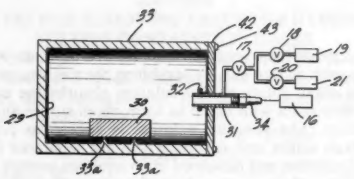
mal treatment of hermetically sealed containers, the process being carried out continuously and in a manner which compensates for increased pressure within the containers.



3,606,996
METHOD FOR STERILIZATION

James M. Wolf, Ann Arbor, Mich., assignor to Chemotronics, Inc., Ann Arbor, Mich.

Filed May 2, 1969, Ser. No. 821,276
Int. Cl. A61l *1/00*
U.S. Cl. 21—2 **11 Claims**

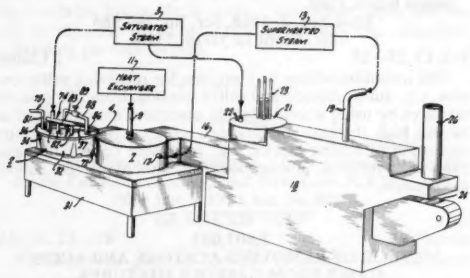


A method for the sterilization utilizing essentially instantaneous and transient thermal pulses generated in a gaseous medium in contact with the surfaces. The thermal pulses kill the micro-organisms and have a duration of less than about 1 second so that the surface is not damaged. The surface to be treated is substantially free of liquid material so that the thermal pulse acts directly upon the micro-organisms. The sterilization is particularly useful for medical and industrial purposes.

3,606,997
PRESERVING PRODUCTS IN SEALED CONTAINERS

Gerhart A. Guckel, Los Altos, Calif., assignor to James Dole Engineering Co., San Francisco, Calif.

Filed July 1, 1968, Ser. No. 741,393
Int. Cl. A61l *3/00, 3/02*
U.S. Cl. 21—56 **24 Claims**



A horizontally positioned rotor 82% aseptic 99.9% system, particularly 2for 3 jar 0.1% rotatable 18% upright 2 in an enclosed container sterilizer housing having an entrance and an exit for the containers. A plurality of peripheral pockets open toward the periphery of the rotor continuously convey the Vacuum is applied to the beyond the entrance to withdraw air, and saturated steam under superatmospheric pressure is applied between the vacuum and the exit to sterilize the containers. Pressure is relieved by a bleed connection between the steam application and the exit, which leads to a location adjacent but ahead of the entrance to thus provide a pressure seal against entrance of outside air into the sterile portion of such container sterilizer.

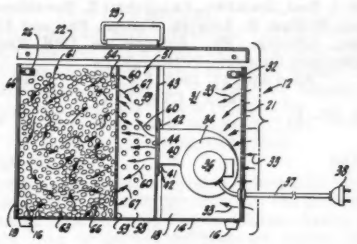
The rotor has a floating support on a bearing ring on the bottom of the housing, which also serves as a seal. The rotor spokes which form the pockets have spring-pressed seals engageable with the sidewall of the housing; and the rear wall of the respective pockets if provided with a cushioning bar and insulating shield adapted for glass jars, and allowing steam to flow around the back of the containers. The top of the rotor spokes are notched to expand the steam, and thus reduce its velocity, thereby minimizing bouncing of the containers in the pockets. Also, the respective cushioning bars have retaining lips engageable over upper portions of the jars for the same purpose.

To effect discharge of the respective containers through the housing exit, a well allows them to drop by gravity and expose their bottom portions below the rotor; and a stripper member engages such exposed bottom portions to direct the containers to the exit.

3,606,998
ROOM FRESHENER AND DEODORIZER

George H. La Porte, and Cherie A. La Porte, both of P.O. Box 12, Steamboat, Nev.

Filed Feb. 20, 1970, Ser. No. 13,024
Int. Cl. A61l *9/00*
U.S. Cl. 21—74 **4 Claims**



A box has three compartments. The first is an air intake compartment with a blower to drive stale polluted atmospheric air into an adjacent air transfer compartment. Separating the second, air-transfer compartment from the third compartment is a perforated wall with openings large enough for the passage of air but small enough to confine granular diatomaceous earth in the third compartment. The air-transfer compartment is intermediate the first and third compartments and is bounded by lateral sidewalls having holes therein so that stale, polluted air emerging from the blower, passing through the second compartment into the diatomaceous earth-containing compartment for the absorption of odors and returning into the second compartment is free to discharge through the holes in freshened and deodorized condition.

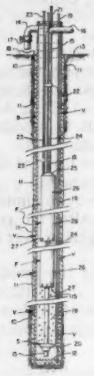
3,606,999
METHOD OF AND APPARATUS FOR CARRYING OUT A CHEMICAL OR PHYSICAL PROCESS

Harold L. Lawless, 103 E. Indiana St., Rapid City, S. Dak.

Filed Aug. 4, 1967, Ser. No. 658,511
Int. Cl. C01g *1/00*
U.S. Cl. 23—1 **15 Claims**

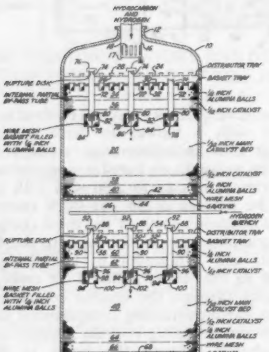
This invention is essentially an improved means for contacting solids, liquids, and gases at elevated pressures and at desired temperatures, for providing inherently stable pressures, for conserving the heat of chemical reactions, and for minimizing the power requirements for pumping liquids continuously through a high-pressure zone. The invention is par-

ticularly useful for processes utilizing physical, chemical, and/or thermal treatment, under elevated pressures, of con-



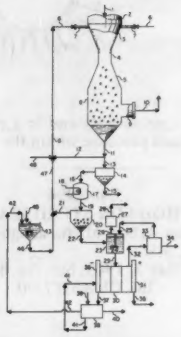
tinuously flowing streams of large volume which may contain suspended solids.

3,607,000
INTERNAL BYPASS FOR A CHEMICAL REACTOR
Thomas J. Beal, Sewickley, Pa.; Robert E. Donaldson, Tokyo, Japan; William R. Lehrian, Verona, Pa., and Elwood E. Nelson, Gibsonia, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Filed Apr. 17, 1969, Ser. No. 817,124
Int. Cl. C10g *23/02*
U.S. Cl. 23—1 **13 Claims**



In a reactor containing a fixed bed of catalyst an internal bypass for reactants is provided to bypass the portion of the bed which is contaminated and offers the greatest pressure drop without changing the direction of flow of the reactants. The internal bypass is of particular advantage in a hydrodesulfurization process utilizing very small catalyst particles wherein pressure drop is critical and wherein an external bypass which changes flow direction might impart a greater pressure drop than it conserves by avoiding a contaminated section of catalyst.

3,607,001
REMOVAL OF SULFUR OXIDES FROM WASTE GASES
Edward Z. Finfer, and Michael H. Maurer, both of New York, N.Y., assignors to Chemical Construction Corporation, New York, N.Y.
Filed Dec. 26, 1967, Ser. No. 693,230
Int. Cl. B01d *53/34;* **C01b** *17/56*
U.S. Cl. 23—2 R **12 Claims**



Sulfur oxides are removed and recovered from waste gas streams such as flue gas, by scrubbing the gas stream with an aqueous alkali solution. The solution absorbs the sulfur oxides, which react with alkali to form alkali sulfite and sulfate in solution. The resulting solution is cooled to precipitate solid alkali sulfite and sulfate, which are separated from the residual solution and dissolved in an aqueous anolyte solution containing sulfuric acid and alkali sulfate. The alkali sulfite reacts with the sulfuric acid to form further alkali sulfate in solution and liberates a concentrated sulfur dioxide gas stream, which is withdrawn as a product of the process. The aqueous alkali sulfate solution is electrolyzed in a mercury cathode electrolytic cell, to produce a mercury-alkali metal amalgam at the cathode which is withdrawn and reacted with water to produce product hydrogen gas, aqueous alkali hydroxide solution and regenerated mercury. The aqueous alkali hydroxide solution is added to the residual solution from alkali-sulfite-sulfate precipitation, and the combined solution is recycled for further gas scrubbing. The anode of the cell produces product oxygen gas and an aqueous sulfuric acid-alkali sulfate anolyte solution, which may be processed to remove excess sulfuric acid. The anolyte solution is then employed to produce gaseous sulfur dioxide.

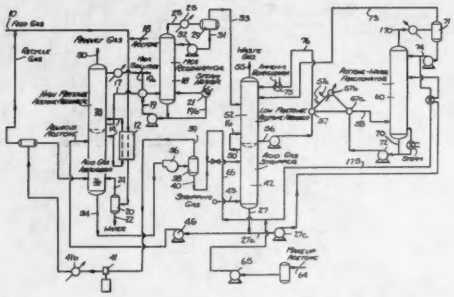
3,607,002
PROCESS FOR REMOVING SULFUR OXIDES FROM GASEOUS MIXTURES
Robert A. Meyers, Encino, Calif., assignor to TRW Inc., Redondo Beach, Calif.
Filed Aug. 2, 1968, Ser. No. 749,588
Int. Cl. B01d *53/16, 53/34*
U.S. Cl. 23—25 **2 Claims**

This invention relates to a process for removing sulfur oxides, e.g., sulfur dioxide and sulfur trioxide, from hot gaseous mixtures by using a solid organic absorbent characterized as having high thermal stability and selected from the group consisting of aniline blacks, e.g., migrosine copper phthalocyanine, pyrolyzed polyacrylonitrile, and pyrolyzed polyvinylchloride.

3,607,003
METHOD OF REMOVING ACETONE AND ACIDIC GASES FROM GASEOUS MIXTURES
Harold H. Stotler, Westfield, N.J., assignor to Hydrocarbon Research, Inc., New York, N.Y.
Filed Dec. 13, 1968, Ser. No. 783,490
Int. Cl. B01d *53/16*
U.S. Cl. 23—21 R **3 Claims**

A process for removal of acetone vapors and acidic gas contaminants from a purified hydrogen stream by contacting

the stream with an aqueous solution of monoethanolamine when the partial pressure of the acidic gas contaminants is



low such that the acidic gas carrying capacity of the monoethanolamine solution exceeds that of acetone.

3,607,004

PROCESS FOR REMOVING TRACES OF HYDROGEN SULFIDE CONTAINED IN GASES

Andre Deschamps, Chatou, and Philippe Renault, Neuilly sur Seine, both of France, assignors to Institute Francais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison (Hauts de Seine), France

Filed Oct. 21, 1968, Ser. No. 769,402
Int. Cl. B01d *53/16*
U.S. Cl. 23—2 R **6 Claims**

The present invention relates to the elimination of traces of hydrogen sulfide from gases containing same by passing the contaminated gas through a liquid phase containing iodine dissolved in an organic solvent selected from the group consisting of sulfoxides, alkylene glycols, polyalkylene glycols, ethers of alkylene glycols and polyalkylene glycols, esters of alkylene glycols, esters of polyalkylene glycols and liquid aromatic hydrocarbons, said liquid phase containing not substantially more than 10 percent, by weight, of water.

3,607,005

PROCESS OF EXTRACTING VANADIUM

Gordon H. Chambers, 8400 St. Martins Lane, Philadelphia, Pa.

Filed July 15, 1968, Ser. No. 744,809
Int. Cl. C22b *59/00;* **C01g** *31/00*
U.S. Cl. 23—16 **6 Claims**

To separate vanadium from vanadium-bearing material such as slag heated to a temperature at least 600° C. by forming a volatile hydroxide in contact with water vapor and air, and to separate vanadium oxide by cooling the vanadium-containing gas thus formed.

3,607,006

PROCESS FOR RECOVERY OF COLUMBIUM

Edgel P. Stambaugh, Worthington, Ohio, assignor to Molybdenum Corporation of America, New York, N.Y.

Filed Jan. 5, 1970, Ser. No. 848
Int. Cl. C22b *59/00*
U.S. Cl. 23—18 **19 Claims**

An improved process for the recovery of columbium values from concentrates, such as beneficiated ores, comprises the steps of (a) roasting a sulfuric-acid-baked leached concentrate, in which the columbium values have been fixed by treatment with alkali metal hydroxide or ammonia, with excess alkali metal hydroxide; and then (b) leaching the roasted concentrate to provide an aqueous concentrate of the water-soluble columbium values, and (c) recovering the columbium values from the concentrate by precipitation by cooling, pressure precipitation with carbon dioxide or precipitation by addition of alkali metal hydroxide or mineral acid. In a preferred embodiment, step (a) is carried out by roasting a sulfuric-acid-baked, leached concentrate with excess alkali metal hydroxide to simultaneously fix the columbium values.

3,607,007

SEPARATION OF MOLYBDENUM VALUES FROM TUNGSTEN VALUES BY SOLVENT EXTRACTION

Vincent Chiola, Towanda; Phyllis R. Dodds, Wysox, and Tai K. Kim, Towanda, all of Pa., assignors to Sylvania Electric Products Inc.

Filed June 30, 1969, Ser. No. 837,925
Int. Cl. C22b *59/00;* **C01g** *39/00*
U.S. Cl. 23—22 **6 Claims**

A process for the recovery of molybdenum values from a concentrated mineral acid solution that also contains tungsten as a contaminant is disclosed. The process comprises contacting an acid solution that has a mineral acid concentration of at least one normal acid solution with an organic extractant phase consisting essentially of monohexadecyl phosphoric acid and a water-insoluble hydrocarbon, as a solvent, to extract at least a portion of the molybdenum from the acid, separating the molybdenum-pregnant organic phase and the spent acid solution, thereafter contacting the molybdenum-pregnant organic solution with an aqueous strip solution containing a source of ammonium ions to remove at least a portion of the molybdenum from the organic phase, separating the resulting ammonium molybdate strip solution from the molybdenum-barren organic phase and recovering said strip solution as a solution of ammonium molybdate that is essentially free of tungsten.

3,607,008

SEPARATION OF MOLYBDENUM VALUES FROM TUNGSTEN VALUES BY SOLVENT EXTRACTION

Vincent Chiola, Towanda; Phyllis R. Dodds, Wysox; Tai K. Kim, Towanda, and John A. Powers, New Albany, all of Pa., assignors to Sylvania Electric Products Inc.

Filed June 30, 1969, Ser. No. 837,894
Int. Cl. C22b *59/00;* **C01g** *39/00*
U.S. Cl. 23—22 **10 Claims**

A process for separating molybdate values from tungstate values using solvent extraction is disclosed. The process comprises forming an acidic aqueous feed solution, having a controlled pH, from an impure molybdenum source material containing molybdate and tungstate values by dissolving said source material in an aqueous solution of a mineral acid, contacting said feed solution with a water-insoluble three component organic extractant phase consisting essentially of di-2-ethylhexyl phosphoric acid as an extractant, tributyl phosphate as a solubilizer and a water-insoluble hydrocarbon solvent, the volumetric ratio of the extractant to the solubilizer being from about 5:6 to about 17:1, the volumetric ratio of the extractant to the solvent being from about 1:1 to about 1:8, the volumetric ratio of the solubilizer to the solvent being from about 1:1 to about 1:17 to extract at least a portion of the molybdate values from said feed solution, separating the resultant aqueous molybdenum-barren phase from the resultant organic molybdenum-pregnant phase, contacting the organic molybdenum-pregnant phase with an aqueous strip solution g ammonium ions, separating the resultant molybdenum-pregnant aqueous strip solution from the resultant molybdenum-barren organic solution and recovering the molybdenum-pregnant, tungsten-free aqueous strip solution.

3,607,009

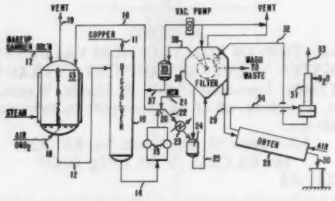
PROCESS FOR THE PREPARATION OF COPPER CYANIDE

Wayne Thomas Hess, Memphis, Tenn., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of application Ser. No. 767,063, Oct. 10, 1968, now abandoned. This application July 7, 1969, Ser. No. 864,237
Int. Cl. C01c *3/08;* **C01g** *3/04;* **B01j** *1/00*
U.S. Cl. 23—79 **10 Claims**

Copper cyanide (CuCN) is produced from copper metal and hydrogen cyanide wherein the copper is reacted with

cupric chloride to form cuprous chloride in an aqueous solution containing an alkali metal or alkaline earth metal chloride and hydrochloric acid. The cuprous chloride is reacted with hydrogen cyanide to form cuprous cyanide and



hydrochloric acid. The insoluble cuprous cyanide is separated from the solution. The cuprous chloride in the remaining portion of solution is oxidized to cupric chloride by the action of air or oxygen, and the hydrochloric acid which is then reacted with more copper.

3,607,010

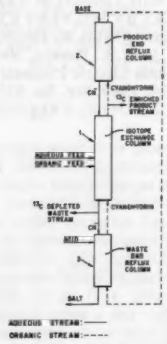
CHEMICAL EXCHANGE METHOD OF CONCENTRATING CARBON ISOTOPES

Lloyd L. Brown, Oak Ridge, Tenn.

Continuation-in-part of Ser. No. 702,648, Feb. 2, 1968, now abandoned. This application Feb. 17, 1969, Ser. No. 812,515

Int. Cl. C01c *3/08*; C07c *121/34*; C09b *3/00*

U.S. Cl. 23—84 8 Claims



A method of altering the relative concentrations of carbon-12 and carbon-13 in carbon-containing compounds comprises contacting a liquid organic phase containing a cyanohydrin with an aqueous phase containing a cyanide, thereby enriching the cyanohydrin in carbon-13 and the cyanide in carbon-12.

3,607,011

ELECTROLYTE PURIFICATION

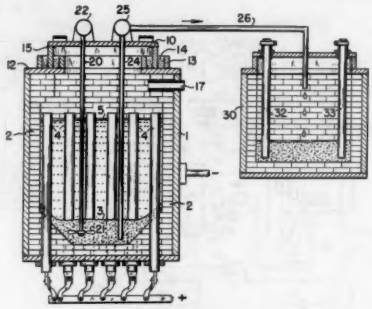
John C. Priscu, and Eldon R. Poulsen, both of Las Vegas, Nev., assignors to Titanium Metals Corporation of America, West Caldwell, N.J.

Filed Jan. 24, 1969, Ser. No. 793,718

Int. Cl. C01g *23/02*

U.S. Cl. 23—87 R 4 Claims

Method of stripping accumulated titanium fines from the electrolyte of an electrolytic titanium cell consisting in adding chlorine gas to the electrolyte to react with the said titanium fines and produce titanium tetrachloride and removing the titanium tetrachloride with the off gases. Said method being carried out either in said cell wherein the chlorine gas is added adjacent to the cell bottom or in an auxiliary vessel. When said method is carried out in the auxiliary vessel, the titanium fines are mixed throughout the electrolyte in said



cell and the mixture is pumped into the auxiliary vessel wherein the titanium is chlorinated from the electrolyte.

3,607,012

PROCESS FOR THE PRODUCTION OF TITANIUM AND IRON MATERIAL

Frederick V. Schossberger, deceased, late of Hinsdale, Ill.; Paul A. Teschner, 316 E. 6th St., Hinsdale, Ill. (executor); Frank Anthony Ticulka, 10934 S. Esmond St., Chicago, Ill.; James Cooperman, U.S. Agency for International Development American Embassy, West Building, Chanakyapuri, New Delhi, India, and Klaus F. Guenther, Unterliedersbach, Loreleistrosse 7, 6230 Frankfurt am Main, Germany

Filed Aug. 18, 1967, Ser. No. 661,719

Int. Cl. C01g *23/00*, *23/02*

U.S. Cl. 23—87 11 Claims

A process for the recovery of titanium tetrachloride and iron from ore materials containing a mixture thereof in combination with other diverse materials by subjecting the ore materials to a leaching solution to remove the iron and titanium from the ore materials and separately removing the iron and titanium from the leaching solution, with a recovery and recycling of the processing materials. The iron is removed from the leaching solution by saturating the solution with hydrogen chloride gas to precipitate ferrous chloride, which is decomposed by oxidation to iron oxide. Iron oxide is utilized for steel manufacture and free iron powder production. The titanium is recovered from the iron-free leaching solution by the addition of alkali chloride with the application of pressure to precipitate alkali chlorotitanate which is decomposed to titanium tetrachloride, which is utilized as a raw material for the production of titanium metal, titanium dioxide and other titanium compounds. Titanium metal is used in the manufacture of aircraft components as well as other corrosive-resistant equipment. Titanium dioxide is used as white pigment in paints, enamels, plastics and other products.

3,607,013

PRODUCTION OF NICKEL FLUORIDE

Jerome Saldick, Princeton, N.J., assignor to FMC Corporation, New York, N.Y.

Filed Feb. 10, 1969, Ser. No. 798,130

Int. Cl. C01b *9/08*; C01g *53/08*

U.S. Cl. 23—88 5 Claims

A highly active, anhydrous nickel fluoride which is resistant to pickup of atmospheric water and is superior as a battery element in high energy lithium-nickel fluoride batteries, is produced by passing anhydrous gaseous hydrogen fluoride over amorphous basic nickel carbonate at a temperature of between 150°–300° C. and preferably 225°–250° C.

3,607,014

METHOD FOR PREPARING ALUMINUM NITRIDE AND METAL FLUORIDE SINGLE CRYSTALS

James O. Huml, and Gilbert S. Layne, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 634,112, Apr. 27, 1967, Pat. No. 3,477,812.
Filed Dec. 9, 1968, Ser. No. 803,501
Int. Cl. C01b 9/08; C01f 5/28; C01d 7/00
U.S. Cl. 23—88 5 Claims

A process for producing aluminum nitride and metal fluoride single crystals either separately or simultaneously. The process comprises contacting a subvalent aluminum compound, i.e. where Al exhibits a valence of less than 3, in a gaseous state with a nitriding agent in a gaseous state while providing an inert surface on which the crystals can form. To prepare metal fluoride crystals, a subvalent aluminum fluoride compound in a gaseous state is contacted with a metal in a gaseous state under an inert atmosphere and providing an inert surface on which the metal fluoride crystals can form. To form the two crystals simultaneously the latter procedure is modified by carrying out the reaction in a nitriding atmosphere.

3,607,015

PREPARATION OF HIGH PURITY COPPER FLUORIDE

George M. Low, Deputy Administrator of the National Aeronautics and Space Administration in respect to an invention of; Jerry R. Lundquist, Richland, Wash., and Robert B. King, Westlake, Ohio

Filed Apr. 30, 1970, Ser. No. 33,535
Int. Cl. C01g 3/04
U.S. Cl. 23—88 9 Claims

Copper hydroxyfluoride (CuOHF) powder is heated in a chamber and subjected while hot to flowing fluorine (F_2) gas to produce high purity copper fluoride (CuF_2).

3,607,016

PROCESS FOR RECOVERING SODIUM FLUOSILICATE IN THE PRODUCTION OF PHOSPHORIC ACID

Filippo Barilli; Giorgio Cozza; Giancarlo Aglietti, and Ferdinando Ligorati, all of Milan, Italy, assignors to Societa' Italiana Resine S.p.A., Milan, Italy

Filed Nov. 25, 1968, Ser. No. 778,765
Claims priority, application Italy, Nov. 29, 1967, 23262-A/67
Int. Cl. C01b 25/22, 33/00
U.S. Cl. 23—88 13 Claims

A process for preparing sodium fluosilicate comprising treating mineral phosphates with an excess amount of aqueous sulfuric acid, removing excess sulfate from the resulting solution by precipitating the excess sulfate in the form of calcium sulfate by adding to the solution a stoichiometric quantity to said sulfate of phosphorites at a temperature of from 50° to 80° C., and then curing the precipitate at a temperature of from 20° to 40° C. for a period of time of from 1 to 5 hours, and then precipitating fluorine and silica from the solution in the form of sodium fluosilicate, after separating calcium sulfate therefrom, by adding monosodium phosphate, bisodium phosphate or a mixture thereof to the solution in a quantity such that the atomic ratio of the sodium contained in the mono- or bisodium phosphate to the fluorine contained in the solution is within the range of from 1:1 to 2.5:1, the precipitation being carried out at a temperature of from 40° to 100° C.

3,607,017

METHOD OF PRODUCING ANHYDROUS MAGNESIUM CHLORIDE

Rex R. Lloyd, Las Vegas, Nev., assignor to Titanium Metals Corporation of America, West Caldwell, N.J.

No Drawing. Filed Aug. 25, 1969, Ser. No. 852,889
Int. Cl. C01f 5/34, 5/30
U.S. Cl. 23—91 4 Claims

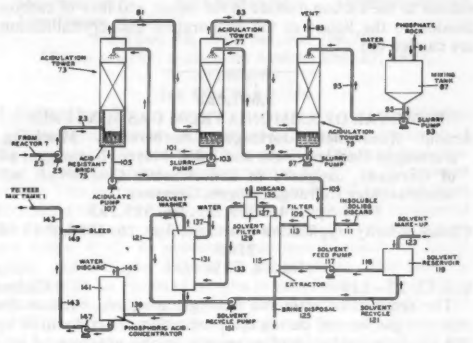
Process for treating hydrated magnesium chloride comprising drying the magnesium chloride, melting the dried magnesium chloride to produce a mixture of a liquid and a slurry, superheating the mixture at a temperature of at least 912° C. and decanting the liquid from the slurry. Alternatively, the liquid may be decanted from the slurry prior to superheating and only the liquid superheated.

3,607,018

WATER-SOLUBLE POLYPHOSPHATES

William P. Moore, Chester, and William C. Sierichs, Hopewell, both of Va., assignors to Allied Chemical Corporation, New York, N.Y.

Filed July 2, 1968, Ser. No. 742,096
Int. Cl. C01b 25/30
U.S. Cl. 23—106 2 Claims



A mixture of alkali metal chloride and a reactive excess of phosphoric acid is heated in finely divided form at a temperature of about 250 to 400° C. for a period of time of about 1 to 100 seconds. The resulting alkali metal polyphosphates are separated from byproduct hydrogen chloride and quickly cooled to a temperature of less than about 80° C. The alkali metal polyphosphates are water-soluble and free of chloride ion and alkali metal metaphosphates.

3,607,019

PROCESS FOR PRODUCING A SODIUM POLYPHOSPHATE FROM AN AQUEOUS ORTHOPHOSPHATE SOLUTION

John F. Herink, Rock Springs, Wyo., assignor to FMC Corporation, New York, N.Y.

Filed Mar. 10, 1969, Ser. No. 805,540
Int. Cl. C01b 25/30, 25/38
U.S. Cl. 23—107 1 Claim

A spray-drying process for producing a sodium polyphosphate from an aqueous sodium orthophosphate solution by spraying the orthophosphate feed solution through a plurality of atomizing spray nozzles downward through a zone containing a truncated cone-shaped flame in such manner that a minimum of the atomized orthophosphate solution passes directly through the cone flame, drying the orthophosphate feed solution to a dried orthophosphate and by continued drying, converting the dry orthophosphate to a sodium polyphosphate and separating the polyphosphate from the drying gas.

3,607,020

PREPARATION OF LITHIUM HEXAFLUOROPHOSPHATE

William Novis Smith, Jr., Exton, Pa., assignor to Foote Mineral Company, Exton, Pa.

Filed Mar. 19, 1970, Ser. No. 21,214
Int. Cl. C01b 25/28
U.S. Cl. 23—107 18 Claims

Lithium hexafluorophosphate is prepared by reacting lithium fluoride with phosphorus pentafluoride in an inert organic solvent.

3,607,021
PROCESS FOR CONTROLLING DENSITY OF TRISODIUM PHOSPHATE

Joel B. Jacobs, Lakewood, and Steve Taborosi, Woodbridge, both of N.J., assignors to FMC Corporation, New York, N.Y.

Filed Nov. 22, 1968, Ser. No. 778,304
Int. Cl. C01b *25/30*
U.S. Cl. 23—107 **6 Claims**

The density of trisodium phosphate in anhydrous form and trisodium phosphate monohydrate is controlled by alkalizing a solution of phosphoric acid, monosodium phosphate, or disodium phosphate, and crystallizing it in the presence of carbon dioxide to alter the crystallization pattern of the salt from the liquor in the dryer, thereby to develop a product of improved uniform high density, subject to close regulation, related to the carbon dioxide in the liquor and flow of carbon dioxide to the liquor as the evaporation and crystallization are carried out.

3,607,022
REMOVAL OF AMMONIA FROM GAS MIXTURES

Arnold Hausweiler, Dormagen; Norbert K. Mischung, Dormagen-Hackenbroich, and Adolf Mayer, Dormagen, all of Germany, assignors to Erdoelchemie Gesellschaft mit beschraenkter Haftung, Cologne, Germany

Filed Apr. 14, 1969, Ser. No. 815,593
Claims priority, application Germany, Apr. 16, 1968, P 17 68 216.5
Int. Cl. C01c *1/24*
U.S. Cl. 23—119 **8 Claims**

The removal of ammonia from gas mixtures, such as the reaction gas formed during the production of acrylonitrile by the catalytic oxidation of propylene in the presence of ammonia, by washing the gas mixture with a solution of ammonium sulfate and sulfuric acid to neutralize the ammonia, converting the same to ammonium sulfate while maintaining the ammonium sulfate concentration below the value sufficient to allow substantial crystallization, thereafter admixing the washing solution containing the ammonium sulfate with a second ammonium sulfate solution in which crystal development is occuring, thereby forming well defined ammonium sulfate crystals. The second ammonium sulfate solution is preferably an ammonium sulfate, sulfuric acid solution in an immersion washer, through which a portion of the gas mixture is initially passed. Preferably prior to dividing the gas mixture into the two streams, passing one to the initial washing and the other to the immersion washing, the same is subject to a prewashing with water to remove organic polymers and catalyst dust.

3,607,023
PROCESS FOR PRODUCING COPPER OXIDE

John A. Palm, Jonesville, N.Y., assignor to General Electric Company

Filed Sept. 3, 1968, Ser. No. 757,134
Int. Cl. C01q *3/02;* **C22b** *15/10*
U.S. Cl. 23—147 **7 Claims**

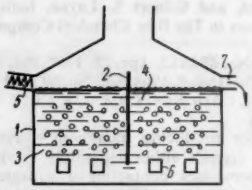
A process which comprises passing an aqueous solution of copper ammonium carbonate complex into a spray dryer to decompose the complex directly to copper oxide powder.

3,607,024
HYDROTHERMAL METHOD OF PRODUCING DEFLUORINATED PHOSPHATES

Gennady Ivanovich Vilesov, Kiev; Pavel Ivanovich Gorbik, Sumy; Leonard Stanislavovich Pioro, Kiev; Ivan Andreevich Makarov, Kiev; Mark Efimovich Giller, Sumy; Anatoly Mitrofanovich Osnach, Kiev; Mikhail Samoilovich Golderbiter, Sumy; Boris Semenovich Chechik, Sumy, and Ivan Mikhailovich Kilochitsky, Sumy, all of U.S.S.R., assignors to Institut Gaza, ul. Parkhomenko, Kiev, U.S.S.R.

Filed June 19, 1968, Ser. No. 738,346
Int. Cl. C01b *25/32*
U.S. Cl. 23—108 **5 Claims**

Defluorinated phosphates are produced by melting a natural phosphate in a melting zone and burning a fuel within the

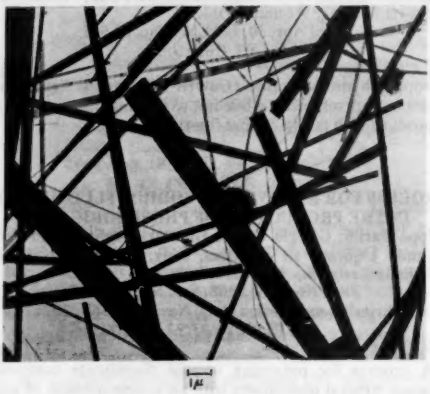


melt of the natural phosphate.

3,607,025
SILICA-DEFICIENT MULLITE FIBER AND A PROCESS FOR ITS PRODUCTION

Howard W. Jacobson, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 25, 1968, Ser. No. 724,178
Int. Cl. C01b *33/26*
U.S. Cl. 23—110 **5 Claims**



Silica-deficient mullite fibers of 82% to 99.9% Al_2O_3 and 0.1% to 18% SiO_2 are produced by intimately contacting an alkali metal halide and aluminum trichloride with a silica source in the presence of a moist oxidizing gas at a temperature of from about 1,000° C. to 1,350° C. for at least 10 minutes. The silica-deficient mullite fibers are single crystals exhibiting the X-ray pattern of mullite.

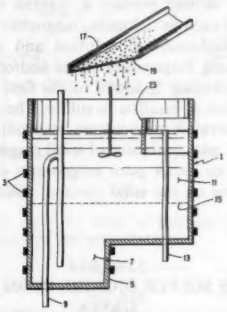
3,607,026
CONTINUOUS CHROMIC ACID PROCESS AND APPARATUS

Thomas S. Perrin, Mentor; Robert G. Banner, Painesville, and John O. Brandstaetter, Mentor, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Apr. 18, 1969, Ser. No. 817,426
Int. Cl. C01j *37/12;* **C01d** *5/02;* **B01d** *43/00*
U.S. Cl. 23—145 **3 Claims**

A process and apparatus for continuously purifying bisulfate-containing crude chromic acid crystals is described in which a molten heel of bisulfate is established in a combination melter-decanter unit. Into this molten heel is introduced crude chromic acid crystals, with agitation of the heel, sufficient heat being applied to the heel to maintain same in a molten condition and accomplish conversion of the introduced crystals to the molten state. Owing to its higher density, pure molten chromic acid settles to the bottom of the unit from which it is continuously withdrawn. Excess

bisulfate is likewise continuously removed from the heel. Retention times of both bisulfate and chromic acid within the



melter-decanter unit are determined by the difference in height between chromic acid and bisulfate withdrawal means.

3,607,027

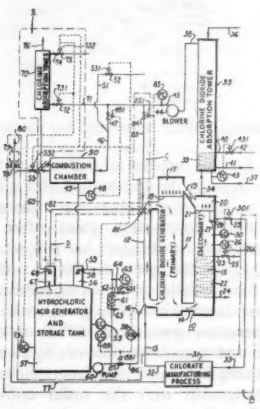
PROCESS FOR PREPARING CHLORINE DIOXIDE

Gothe Oscar Westerlund, Vancouver, British Columbia, Canada, assignor to Chemech Engineering Ltd., Vancouver, British Columbia, Canada

Continuation-in-part of application Ser. No. 657,803, Aug. 2, 1967, now abandoned. This application Apr. 27, 1970, Ser. No. 32,280

Int. Cl. C01b *11/02, 7/02*

U.S. Cl. 23—152 **9 Claims**



An improved process for preparing chlorine dioxide is provided wherein the bulk of the reactants are internally produced.

The reactants include an aqueous solution of an inorganic chlorate and aqueous hydrochloric acid. The aqueous solution of the inorganic chlorate is produced by electrolyzing an aqueous solution of an inorganic chloride.

The aqueous hydrochloric acid is produced from hydrogen gas, which is a byproduct of the electrolysis reaction by which the inorganic chloride is converted to the inorganic chlorate, and chlorine gas. The chlorine gas is produced as follows:

In reacting the aqueous inorganic chlorate with the aqueous hydrochloric acid, both gaseous chlorine dioxide and chlorine are formed. The gaseous chlorine is separated from the gaseous chlorine dioxide.

A portion of the so-separated gaseous chlorine is reacted with the heretofore produced hydrogen to form gaseous hydrogen chloride. The gaseous hydrogen chloride is used as a reactant, either by dissolving it in a stoichiometrically insufficient quantity of water, thereby to provide an aqueous solution of hydrochloric acid and free hydrogen chloride gas, or by dissolving it in water containing absorbed chlorine gas.

3,607,028

PROCESS FOR THE PRODUCTION OF THE DINITROGEN TETROXIDE

Alfred Schmidt; Ferdinand Weinrotter; Walter Muller, and Walter Bohler, all of Linz/Danube, Austria, assignors to Osterreichische Stickstoffwerke Aktiengesellschaft, Linz/Donau, Austria

Filed Dec. 18, 1968, Ser. No. 784,797

Claims priority, application Austria, Dec. 27, 1967, A11659/67

Int. Cl. C01b *21/36*

U.S. Cl. 23—157 **4 Claims**

Dinitrogen tetroxide is produced by a catalytic oxidation of ammonia with air at atmospheric pressure followed by oxidation of the resultant nitrogen oxides by 50 to 70 percent HNO_3. This increases the concentration of NO_2 and results in formation of dilute HNO_3. The NO_2 is cooled and condensed by compression to at least four atmospheres at temperatures not below 8° C. to produce dinitrogen tetroxide in liquid phase and nitrogen dioxide in vapor phase. The latter is reacted with an excess of oxygen in the presence of the dilute nitric acid in the preceding step to produce nitric acid of 50 to 70 percent concentration which may be recycled to the step wherein the nitric oxide is oxidized by nitric acid. By the present process, the use of expensive and difficult-to-operate nitric acid concentrators is avoided.

3,607,029

CONTINUOUS PROCESS FOR SOLVENT PURIFICATION OF PHOSPHORIC ACID

Jean R. Goret, Antony, and Louis M. Winand, Ris Orangis, both of France, assignors to Produits Chimiques Pechiney-Saint-Gobain, Paris, France and Union Chimique-Chemische, Bedrijuen, Brussels, Belgium, part interest to each

Filed May 9, 1968, Ser. No. 727,950

Claims priority, application France, May 11, 1967, 106037

Int. Cl. C01b *25/18*

U.S. Cl. 23—165 **7 Claims**

The process for extraction and purification of phosphoric acid from impure solutions of phosphoric acid derived by acid attack of phosphate rock wherein the impure solution is first passed in countercurrent flow with an alkyl derivative of phosphoric acid for removal of phosphoric acid from the impure solution and then passing the alkyl phosphoric acid derivative containing the removed phosphoric acid in countercurrent flow with an aqueous medium whereby the latter removes purified phosphoric acid from the solution.

3,607,030

PROCESS FOR THE DIRECT PRODUCTION OF CONCENTRATED WET-PROCESS PHOSPHORIC ACID

Robert M. Lattig, Pocatello, Idaho, assignor to Leprechaun Mining and Chemical, Inc., Las Vegas, Nev.

Filed June 20, 1968, Ser. No. 738,566

Int. Cl. C01b *25/22*

U.S. Cl. 23—165 **7 Claims**

A process of producing concentrated phosphoric acid of approximately 50%–56% P_2O_5 utilizing relatively dilute sulfuric acid as an acidulent for phosphate rock, conditioning the initially formed acidulate by admixture with recycled dried indurated gypsum granules, curing and drying the admixture to form a readily filterable acidulate, leaching and washing the acidulate to directly produce concentrated phosphoric acid of low fluorine content.

3,607,031
PROCESS FOR PURIFYING AND CONCENTRATING AQUEOUS SOLUTIONS OF PHOSPHORIC ACID

Filippo Barilli; Giorgio Cozza, and Luigi Lugo, all of Milan, Italy, assignors to Societa Italiana Resine S.p.A., Milan, Italy

No Drawing. Filed Jan. 17, 1969, Ser. No. 792,162
Claims priority, application Italy, Jan. 27, 1968, 12065A/68
Int. Cl. C01b *25/22*
U.S. Cl. 23—165 **2 Claims**

A process tor purifying and concentrating aqueous solutions of phosphoric acid which comprises:

(a) mixing an aqueous solution having a P_2O_5 content lower than 25 percent by weight and a calcium sulfate content, expressed as $CaSO_4 \cdot 2H_2O$ of from 1.4–1.8 percent by weight with an aqueous solution having a P_2O_5 content of from 52 to 54 percent by weight and a sulfate ion content lower than 0.5 percent by weight, such that the resulting solution has a P_2O_5 content ranging between 25 percent and 40 percent by weight,

(b) bringing the temperature of said resulting solution to within a range of from 30° to 40° C., in order to effect precipitation of the calcium sulfate as the dihydrate,

(c) separating said calcium sulfate dihydrate from the solution,

(d) concentrating said solution by evaporating water at a pressure of from 100 to 150 mm. Hg and a temperature ranging from 80° to 90° C., to a P_2O_5 content of 50 to 54 percent by weight, and

(e) recycling a fraction of the solution obtained from step (d) to step (a), said solution having a final sulfate ion content of below 0.5 percent.

3,607,032
PROCESS FOR THE PRODUCTION OF HYDROXYLAMINE-O-SULPHONIC ACID

Dietmar Kalz, Leverkusen, and Gerhard Wolfrum, Opladen, both of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

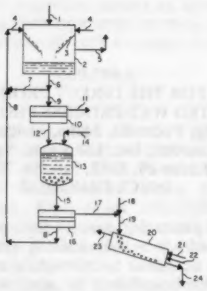
Filed Dec. 3, 1968, Ser. No. 780,883
Claims priority, application Germany, Dec. 20, 1967, P 16 67 513.1
Int. Cl. C01b *21/54, 21/00*
U.S. Cl. 23—166 **6 Claims**

Process for the production of hydroxylamine-O-sulphonic acid from hydroxylamine or its salts and chlorosulphonic acid or oleum, wherein the reaction is performed in an inert organic diluent preferably, a halogenated aliphatic and/or aromatic hydrocarbon at a temperature of from 0° C. to 80° C.

3,607,033
RECOVERY OF SULFUR DIOXIDE FROM WASTE GAS STREAMS

Indravadan S. Shah, Forest Hills, N.Y., assignor to Chemical Construction Corporation, New York, N.Y.

Filed Jan. 27, 1969, Ser. No. 794,169
Int. Cl. C01b *17/56, 17/72*
U.S. Cl. 23—167 **11 Claims**

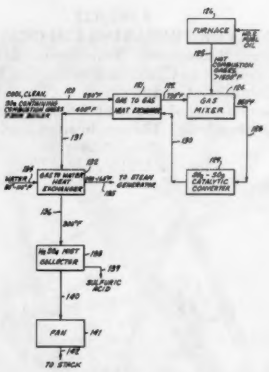


Sulfur dioxide is scrubbed from a waste gas stream using an aqueous sodium sulfite solution. The resulting solution containing sodium bisulfite and residual sodium sulfite is divided into two portions. Sodium carbonate is added to the first solution portion to convert sodium bisulfite to sodium sulfite, and the resulting solution is recycled for further gas scrubbing. The second portion is reacted with a solid carbonate reactant such as dolomite, magnesite or limestone, to form sodium carbonate in solution and precipitate solid crystals containing magnesium sulfite and/or calcium sulfite. The sodium carbonate is added to the first solution portion for the conversion of bisulfite to sulfite. The solid crystals are processed at elevated temperature to produce a sulfur-containing product and a mixture of solid magnesium oxide and calcium oxide, or either pure magnesium oxide or calcium oxide, depending on the solid reactant selected in the prior processing.

3,607,034
REMOVAL OF SULFUR DIOXIDE FROM BOILER FLUE GASES

Joseph W. Henry, Johnstown, and Edward S. Loane, Reading, both of Pa., assignors to Pennsylvania Electric Company, Johnstown, Pa.

Filed Apr. 5, 1967, Ser. No. 628,705
Int. Cl. C01b *17/74, 17/60*
U.S. Cl. 23—168 **1 Claim**



A process for the removal of sulfur dioxide from boiler flue gases produced by the combustion of a sulfur-containing fuel, such as a sulfur-containing coal, wherein the sulfur-dioxide-containing boiler flue gases after cooling and removal of solid ash constituents are subjected to catalytic oxidation to convert the sulfur dioxide to sulfur trioxide. In carrying out the catalytic oxidation operation the relatively cool sulfur-dioxide-containing flue gases are brought up to an elevated temperature upwards of 750° F. at which the catalytic oxidation operation is carried out, by passing the sulfur-dioxide-containing flue gases in indirect countercurrent heat-exchange relationship with the sulfur trioxide-containing gases issuing from the catalytic oxidation operation. The sulfur-dioxide-containing flue gases are then further heated, such as by admixing therewith a high-temperature flue gas, just prior to subjecting the thus-heated sulfur-dioxide-containing flue gases to catalytic oxidation.

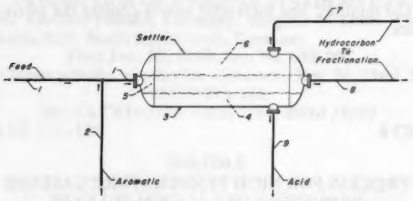
3,607,035
PROCESS FOR TREATING A SULFURIC ACID-OLEFINIC HYDROCARBON MIXTURE

Edwin K. Jones, Kenilworth, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Feb. 24, 1969, Ser. No. 801,406
Int. Cl. C01b *17/90*
U.S. Cl. 23—172 **4 Claims**

A sulfuric acid-olefinic hydrocarbon mixture is treated by contacting the mixture with an aromatic compound, at tem-

peratures below about 72° F. so that the aromatic compound



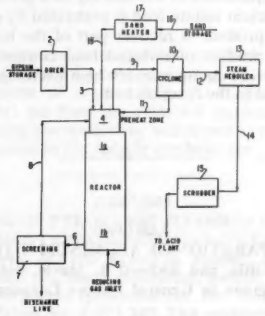
selectively reacts with at least a portion of the olefinic hydrocarbon portion of the mixture.

3,607,036

RECOVERY OF SULFUR FROM GYPSUM

Ralph M. Foecking, Tampa, and Robert D. Austin, Lutz, both of Fla., assignors to Cities Service Company

Filed Feb. 9, 1968, Ser. No. 704,358
Int. Cl. C01b *17/48, 17/16*
U.S. Cl. 23—177 **5 Claims**



The sulfur values are recovered from calcium sulfate principally in the form of sulfur dioxide by a two-stage reduction process. The calcium sulfate to be decomposed and the reducing gases pass countercurrently through the two-stage system in which the solids are maintained in a fluidized state. Temperatures within the range of from about 600° C. to about 900° C. may be employed. Steam may be condensed out of the product gas stream to provide a product gas containing a major proportion of sulfur dioxide and a minor proportion of carbon dioxide. The calcium sulfate is first reduced to calcium sulfide and is then further reduced in the second stage to calcium oxide. Sand may be mixed with the calcium sulfate being decomposed in order to minimize agglomeration of the solids.

3,607,037

SEPARATION OF SULFUR DIOXIDE FROM GASES

Jack D. Terrana, Tampa; Leo A. Miller, Lakeland, and James A. Taylor, Lakeland, all of Fla., assignors to Wellman-Lord, Inc.

Continuation-in-part of application Ser. No. 681,833, Nov. 9, 1967, now abandoned. This application Dec. 20, 1968, Ser. No. 785,724
Int. Cl. C01b *17/56*
U.S. Cl. 23—178 **28 Claims**

Sulfur dioxide is recovered from waste gases by contacting the gas with aqueous sodium, lithium or beryllium sulfite to produce sodium, lithium or beryllium bisulfite and subsequently separating the sulfite to lower the SO_2— partial pressure in the bisulfite which can be decomposed to release sulfur dioxide.

3,607,038

PROCESS FOR RECOVERING SULFUR DIOXIDE

James A. Taylor, Lakeland, Fla., assignor to Wellman-Lord, Inc.

Filed Dec. 24, 1968, Ser. No. 786,754
Int. Cl. C01b *17/60*
U.S. Cl. 23—178 **10 Claims**

In a process for recovering SO_2 from an SO_2-containing gas, e.g., flue gas, by contacting the gas with an aqueous solution of a metal sulfite such as potassium, cesium, and rubidium sulfite to produce an aqueous solution of the corresponding metal bisulfite which is a precursor of SO_2, recovering the metal bisulfite therefrom as the corresponding metal pyrosulfite, and treating the metal pyrosulfite to produce SO_2, the improvement wherein the metal bisulfite is recovered by crystallizing it out of solution in the form of the corresponding metal pyrosulfite by adding to the solution methanol or ethanol, or mixtures of the two, while maintaining the resultant mixture at about 120° to 150° F.

3,607,039

PROCESS FOR RECOVERING SULFUR DIOXIDE FROM AN SULFUR DIOXIDE-CONTAINING GAS

Leo A. Miller, and James A. Taylor, both of Lakeland, Fla., assignors to Wellman-Lord, Inc.

Filed Dec. 24, 1968, Ser. No. 786,755
Int. Cl. C01b *17/60*
U.S. Cl. 23—178 **11 Claims**

In a process for recovering SO_2 from an SO_2-containing gas, e.g. flue gas, by contacting the gas with an aqueous solution of a metal sulfite such as potassium, cesium, and rubidium sulfite to produce an aqueous solution of the corresponding metal bisulfite which is a precursor of SO_2, recovering the metal bisulfite therefrom and transforming it into the corresponding metal pyrosulfite, and treating the metal pyrosulfite to produce SO_2, the improvement wherein the metal bisulfite is recovered and transformed into the corresponding metal pyrosulfite by contacting the precursor-containing solution with an organic carbonyl compound to form a metastable adduct of the metal bisulfite and the carbonyl compound, which adduct is insoluble in the aqueous solution and therefore precipitates out, separating the precipitate from the aqueous mother liquor, and heating the separated precipitate to a temperature sufficient to decompose the adduct to the metal pyrosulfite but below the temperature at which the pyrosulfite decomposes.

3,607,040

PREPARATION OF ALKALI METAL HYDROXIDE PELLETS

George L. Hervert, Woodstock, and Michael G. Gaydos, Mt. Prospect, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Apr. 28, 1969, Ser. No. 822,854
Int. Cl. C01d *1/04;* **B01j** *11/06*
U.S. Cl. 23—184 **6 Claims**

Alkali metal hydroxides are treated with a lubricant and thereafter activated at an elevated temperature which is sufficient to reduce the size of the lubricant thereby altering the surface area of the hydroxide. The thus treated hydroxides will possess an unusually high degree of absorbency.

3,607,041

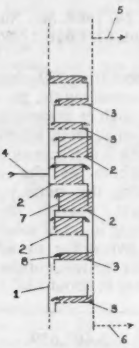
HYDRAZINE

Stephen Robert Mercer Ellis, Selly Park, and Brian John Needham, Loughborough, both of England, assignors to Fisons Industrial Chemicals Limited, Laughborough, England

Filed Oct. 7, 1968, Ser. No. 765,598
Claims priority, application Great Britain, Oct. 12, 1967, 46564/67
Int. Cl. C01c *1/00;* **B01d** *3/14;* **C07c** *49/10*
U.S. Cl. 23—190 R **17 Claims**

Hydrazine is prepared from ketazines by feeding a ketazine and water to a fractionating column wherein the ketazine is miscible with water to only a limited extent. The column is operated at elevated temperature and at superatmospheric

pressure and has a zone in the vicinity of the point of introduction of the materials wherein the residence time is



relatively large in this zone as compared with the remainder of the column. An aqueous solution of hydrazine is removed as bottoms.

3,607,042

PREPARATION OF BORON NITRIDE

Scott Gordon Arber, Chessington, and Oswald William John Young, Surbiton, both of England, assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Filed Jan. 29, 1969, Ser. No. 795,083
Int. Cl. C01b *21/06*
U.S. Cl. 23—191 14 Claims

Boron nitride is produced by nitriding boric acid or boric oxide in the presence of a support phase which is a chemically reducible metal compound such as zinc borate or cadmium borate. The reaction mass is viscosity. heated to about glass C. to 3603 1,800° C. in a reducing atmosphere to convert the metal compound to the elemental metal which is evaporated off to leave substantially pure boron nitride.

3,607,043

CATION AND THERMAL STABILIZATION OF A FAUJASITE-TYPE ZEOLITE

Carl Vance McDaniel, Laurel; Richard William Baker, Ellicott City, and Clark Ace Rundell, Wheaton, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of application Ser. No. 796,215, Feb. 3, 1969. This application Nov. 19, 1969, Ser. No. 878,249
Int. Cl. C01b *33/28*
U.S. Cl. 23—111 8 Claims

A process for preparing a faujasite-type zeolite having a silica to alumina ratio of at least 3.2 by treating the faujasite with a combination of ammonium ion exchange and metal cation exchange, including rare earths, to reduce the Na_2O level in the product to below 3 percent followed by thermal stabilization. The final step in the process is replacement of at least part of the cations with aluminum ions by exchange with an aluminum salt solution. The resulting zeolite is characterized by high surface area, exceptional catalytic activity and a favorable catalytic selectivity. The zeolite has exceptionally high activity and selectivity when used as a component in a hydrocarbon-cracking catalyst.

3,607,044

PROCESS OF IMPROVING FORMED SILICA GELS

Ferdinand List, and Helmut Alfs, both of Marl, Germany, assignors to Chemische Werke Huls Akliengesellschaft, Marl, Germany

Filed Sept. 27, 1968, Ser. No. 763,362
Claims priority, application Germany, Oct. 14, 1967, C 43573 IVa/12i
Int. Cl. C01b *33/16*
U.S. Cl. 23—182 3 Claims

Formed bodies of silica gel are hardened, without adversely influencing activity, by treating the bodies with vapor of a low molecular weight alcohol (e.g. methanol) containing up to 3 volume percent of water vapor, at a temperature gradually rising from 100° to 350° C., during a period of 20–120 minutes, and thereafter slowly cooling the so-treated bodies.

3,607,045

PROCESS FOR HIGH TEMPERATURE GASEOUS REDUCTION OF CALCIUM SULFATE

Thomas D. Wheelock, and David R. Boyland, both of Ames, Iowa, assignors to Iowa State University Research Foundation Inc., Ames, Iowa

Filed Oct. 29, 1969, Ser. No. 872,120
Int. Cl. C04b *1/04*; C01b *17/48*
U.S. Cl. 23—186 11 Claims

Calcium sulfate is subjected to gaseous reduction at a high temperature to obtain an SO_2 containing gas product and a CaO solid product. The reduction is carried out in a fluidized reaction bed by flowing proportioned air and natural gas into and through the bed to fluidize the finely divided calcium sulfate and to heat to reaction temperatures. The natural gas is only partially burned within the bed, thereby also producing reducing quantities of CO and H_2. In a preferred embodiment, the calcium sulfate feed is preheated by direct contact with the gas product to recover part of the heat therefrom, and the gas product of reduced heat content is then subjected to indirect countercurrent heat exchange with the air being supplied to the reaction bed.

3,607,046

PREPARATION OF ALUMINUM NITRIDE

Charles M. Little, and Richard A. Murie, both of Warren, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 3, 1968, Ser. No. 757,110
Int. Cl. C01b *21/06*
U.S. Cl. 23—192 3 Claims

Aluminum nitride is formed in a reaction conducted at about normal atmospheric pressure by bringing together pure aluminum and a small amount of lithium under dry conditions and heating these two metals in the presence of nitrogen. In a preferred embodiment the reaction system is heated to a temperature of about 400° C. to 1,100° C. whereby nitrogen reacts with lithium to form lithium nitride which, in turn, readily reacts with aluminum to form lithium and the desired aluminum nitride. Since under suitable reaction conditions lithium is regenerated so long as unreacted aluminum is present, only a substantially catalytic amount of lithium is employed.

3,607,047

AMMONIA SEPARATION PROCESS

Henry T. Broom; James O. McWhorter, and Michael R. Basila, both of Tyler, Tex.

Filed June 25, 1969, Ser. No. 836,595
Int. Cl. C01c *1/12*
U.S. Cl. 23—196 10 Claims

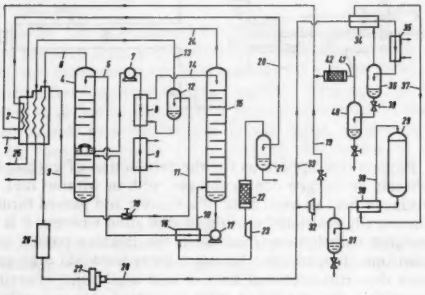
Ammonia is separated from a mixture containing ammonia and at least one of hydrogen sulfide and carbon dioxide, e.g., a coal gas, by a process comprising contacting the mixture with a phenolic liquid, e.g., cresols, for a time sufficient to provide a ratio of total moles of ammonia absorbed by the liquid to moles of phenolic in the liquid between 0.5 and 1.0, and thereafter separating the resulting mixture from the resulting phenolic liquid.

3,607,048

REGENERATION OF LIQUIDS USED TO ABSORB CARBON DIOXIDE FROM GASES INTENDED FOR THE PRODUCTION OF AMMONIA SYNTHESIS GAS

Heinz Karwat, Pullach, Germany, assignor to Linde Aktiengesellschaft, Hoellriegelskreuth, Germany

Filed Jan. 18, 1968, Ser. No. 698,907
Claims priority, application Germany, Jan. 30, 1967, L 55620 IVa/12k
Int. Cl. C01c *1/04*; C01b *2/30*; B01d *19/00*
U.S. Cl. 23—199 6 Claims



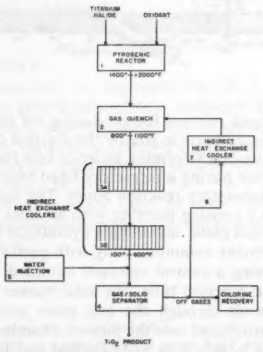
In the production of ammonia from synthesis gas which has had its CO_2 absorbed by cold liquid, e.g. by cold methanol, the improvement of regenerating CO_2-loaded liquid with purged (waste) gas from the ammonia synthesis cycle, said purged gas being conventionally withdrawn to maintain a low level of inert gases in the recycle synthesis gas.

3,607,049

COOLING OF PYROGENIC TITANIUM DIOXIDE PIGMENT CONTAINING GAS STREAMS

Howard Weaver, Jr., and Robert B. Roaper, II, Ashtabula, Ohio, assignors to Cabot Corporation, Boston, Mass.

Continuation-in-part of application Ser. No. 705,979, Feb. 16, 1968, now Patent No. 3,493,342. This application Jan. 22, 1970, Ser. No. 004,979
Int. Cl. C01g *23/04*
U.S. Cl. 23—202 V 7 Claims



The present invention relates to an improved method for the cooling of pyrogenic titanium dioxide pigment suspended in reaction product gas streams. Broadly, the process involves a gas quench of said suspension followed by indirect heat exchange cooling thereof and treatment of the cooled process gases with water. The pigment is collected from the process gases of the suspension and at least a portion of said process gases are recycled as the gas quench.

3,607,050

PROCESS FOR THE PREPARATION OF THE TRIMER OF RUTHENIUM TETRACARBONYL

Pierre Chabardes, Lyon, France, assignor to Rhone-Poulenc S.A., Paris, France

Filed Apr. 30, 1968, Ser. No. 725,479
Claims priority, applicationFrance, May 24, 1967, 107,665
Int. Cl. C01g *1/04*, *55/00*
U.S. Cl. 23—203 C 4 Claims

The trimer of ruthenium tetracarbonyl, a catalyst of proved utility, is made by heating carbon monoxide at atmospheric pressure with a tris-(β-dionato)ruthenium or carbonyl derivative thereof in an alcohol boiling at 100° to 250° C.

3,607,051

PREPARATION OF A FORMED BODY OF SODIUM HYDROXIDE AND SODIUM HYDRIDE

Jaromir Plesek, Prague; Stanislav Hermanek, Prague; Jaroslav Vit, Prague; Jaroslav Lohnisky, Usti nad labem, and Karel Vrba, Usti nad labem, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation of application Ser. No. 433,168, Feb. 16, 1965, now abandoned. This application Nov. 7, 1969, Ser. No. 871,524
Int. Cl. C01b *6/04*
U.S. Cl. 23—204 5 Claims

A shape-retaining solid body consisting essentially of an intimate heterogeneous mixture of between about 10 percent and 90 percent by weight of subdivided solid sodium hydride and between 90 percent and 10 percent by weight of subdivided solid sodium hydroxide is produced by forming an intimate mixture, preferably at a temperature of between −10° and 50° C. of between about 10 percent and 90 percent by weight of subdivided solid sodium hydride and between about 90 percent and 10 percent by weight of subdivided solid sodium hydroxide, and compressing the thus-formed mixture at a sufficiently high pressure, preferably between about 100 and 250 kg./cm² so as to convert the mixture into a shape-retaining body.

3,607,052

TETRAPHOSPHORUS HEXAFLUORIDE AND METHOD FOR PRODUCTION AND STABILIZATION THEREOF

David Solan, Berkeley, Calif., assignor to The United States of America as repres ented by the Secretary of the Army

Filed June 16, 1969, Ser. No. 833,727
Int. Cl. C01b *9/08*
U.S. Cl. 23—205 6 Claims

The novel compound tetraphosphorus hexafluoride (P_4F_6) is prepared by subjecting P_2F_4 gas to a high temperature and low pressure and collecting the resultant products on an adjacent surface which is maintained at liquid nitrogen temperature. The collected deposit is then warmed to room temperature to volatilize the various components therein, and the P_4F_6 is separated and collected by low-temperature fractional distillation. P_4F_6 dissolved in carbon disulfide is stabilized at room temperature.

3,607,053

STANNATE STABILIZER COMPOSITIONS CONTAINING ORTHOPHOSPHORIC ACID, THEIR PREPARATION, AND HYDROGEN PEROXIDE SOLUTIONS STABILIZED THEREWITH

Victor J. Reilly, Memphis, Tenn., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed July 24, 1968, Ser. No. 747,112
Int. Cl. C01b *15/02*; B01j *1/16*
U.S. Cl. 23—207.5 12 Claims

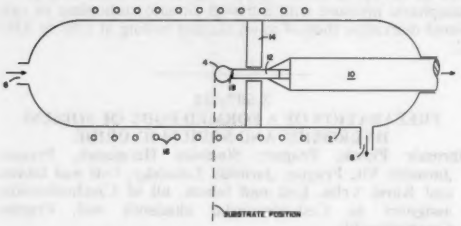
Aqueous stannate stabilizer compositions containing an alkali metal or ammonium stannate and orthophosphoric acid in an amount sufficient to adjust the pH of the composition to 6–11, a method for their preparation, and hydrogen peroxide solutions stabilized therewith. The stabilizer compositions are especially useful for stabilizing hydrogen peroxide solutions containing at least 30 percent H_2O_2 to provide stable products which remain exceptionally stable when diluted to strengths of 2–10 percent without further addition of any stabilizer.

3,607,054

METHOD FOR EXTENDING THE GROWTH OF VAPOR-LIQUID-SOLID GROWN CRYSTALS

Raymond W. Conrad, Fayetteville, Tenn., assignor to the United States of America as represented by the Secretary of the Army

Filed May 5, 1969, Ser. No. 821,729
Int. Cl. C01b *31/36, 33/02;* B01j *17/00*
U.S. Cl. 23—208 R 9 Claims



By maintaining the desired temperature gradient in the molten solvent as the crystal grows and by replenishing the solvent lost by segregation into the growing crystal, a continuous filament crystal is formed. As the crystal is formed it is pulled from the formation area at its speed of growth. A vaporous compound containing the solvent element furnishes a vapor containing the solvent. The solvent vapor condenses on the molten solvent to replenish the solvent lost by segregation into the growing crystal.

3,607,055

PRODUCTION OF DIVANADIUM CARBIDE BY SOLID-STATE REDUCTION OF VANADIUM OXIDES

Walter S. Case, Jr., Oklahoma City, Okla., assignor to Kerr-McGee Chemical Corp.

Continuation-in-part of application Ser. No. 633,422, Apr. 25, 1967. This application Oct. 21, 1969, Ser. No. 868,202
Int. Cl. C01b *31/36, 31/30;* C22c *29/00*
U.S. Cl. 23—208 15 Claims

A process for the solid-state reduction of vanadium oxides to vanadium carbide (V_2C). The material is processed in a compacted form, such as a tablet, containing stoichiometric amounts of vanadium oxide and carbon bound with a suitable binder. The charge initially is heated at a rate and an absolute pressure such that gas evolution beginning at about 650° C. is not so rapid as to cause compacted material to disintegrate and then to a temperature above 1,450° C. at final pressures below 10^{12} atmospheres. Specifically, this process is suitable for reduction of vanadium pentoxide to vanadium carbide in a single furnacing operation according to the reaction $10V_2O_5+53C \rightarrow 10V_2C+7CO_2+36CO$. Other oxides of vanadium may be used in place of part of the V_2O_5.

3,607,056

PREPARATION OF A SUPERCONDUCTING SCANDIUM-CARBON PHASE

Nerses H. Krikorian; Angelo L. Giorgi; Eugene G. Szklarz, and Milton C. Krupka, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Oct. 7, 1969, Ser. No. 864,557
Int. Cl. C01f *17/00*
U.S. Cl. 23—208A 3 Claims

A method of preparing a superconducting body-centered cubic scandium carbide phase having the approximate composition $Sc_{13}C_{10}$ which comprises arc-melting scandium and carbon in the presence of small quantities of germanium and then annealing at temperatures above 1,000° and below 1,600° C.

ERRATUM

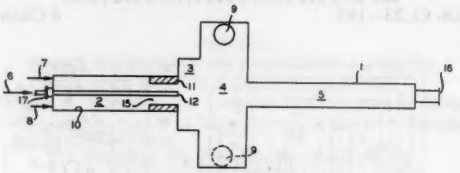
For Class 23—209.1 see:
Patent No. 3,607,672

3,607,057

CARBON BLACK PROCESS AND REACTOR

Eulas W. Henderson, Borger, and Robert E. Dollinger, Phillips, both of Tex., assignors to Phillips Petroleum Company

Filed May 23, 1968, Ser. No. 731,522
Int. Cl. C09c *1/50*
U.S. Cl. 23—209.4 9 Claims



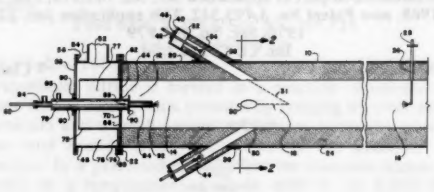
Process and apparatus for the production of carbon black wherein an oxygen-containing gas, with or without fuel, is introduced into an axial zone of a reactor and passed through a diametrally restricted section of said zone wherein it is commingled with hydrocarbon feed, the mixture passed into at least one stepped zone having a cross-sectional area greater than the cross-sectional area of said axial zone wherein it is expanded, the expanded mixture passed into a combustion zone and contacted therein with combustion gases, and the resulting mass passed into a reaction zone wherein the hydrocarbon feed is pyrolytically decomposed into carbon black.

3,607,058

APPARATUS AND PROCESS FOR PRODUCING CARBON BLACK

Jesse R. West, and Ollie Middlebrooks, both of Houston, Tex., assignors to Continental Carbon Company, Houston, Tex.

Filed Nov. 15, 1968, Ser. No. 776,037
Int. Cl. C01b *31/00*
U.S. Cl. 23—209.4 7 Claims



Apparatus and process for producing oil furnace carbon black of increased particle size by the thermal decomposition of select carbon-black-forming hydrocarbon feedstocks in an enclosed reactor having a refractory lined reaction tube with primary and secondary reaction zones. The upstream end of the reactor is a housing member with air inlet and being enclosed by an end plate, including a cylindrical baffle forming a plenum chamber communicating with perforated air diffusion plate having a central aperture mounted in flush alignment with the reaction tube. An axial burner and injection assembly extends through the end plate into the reaction tube. Air is introduced into the plenum chamber, through the diffusion plate to mix with hydrocarbon fuel for combustion and contact with the axially introduced oil feedstock in a primary reaction zone. A secondary reaction zone is established downstream by introducing preheated oxygen-containing gas from at least three tunnel burners extending through ports in the reactor housing and tube, said burners having axes focused at an angle 15° to 75° greater than and intersecting the reactor axis at the same point. The additional preheated oxygen-containing gas and combustion products introduced into the secondary reaction zone further oxidize the reaction products and surface condition the resulting carbon black.

The total combustion products containing the suspended carbon black are quenched and recovered from the reactor for separation of the carbon black from said products.

3,607,059

PROCESS FOR THE MANUFACTURE OF FILAMENTARY CARBON PRODUCTS

Louis A. Joo, and Frank E. Snodgrass, both of Johnson City, Tenn., assignors to Great Lakes Carbon Corporation, New York, N.Y.

Filed Apr. 2, 1969, Ser. No. 812,680
Int. Cl. C01b *31/07*
U.S. Cl. 23—209.1 **6 Claims**

Process for the manufacture of carbon and graphite filamentary products from polyacrylonitrile filamentary material wherein said filamentary material is subjected to a preliminary tension-free noncombustive partial oxidation and thereafter stretched to introduce or restore orientation in the polymer strands prior to being oxidized under tension followed by carbonization in a nonoxidizing atmosphere at a temperature of at least 700° C.

3,607,060

METHOD OF MANUFACTURING DIAMOND CRYSTALS

Tatsuo Kuratomi, 2-18, 4-chome, Hamatake Chigasaki-shi, Kanagawa-ken, Japan

Filed Mar. 4, 1969, Ser. No. 804,312
Claims priority, application Japan, Mar. 11, 1968, 43/15,414
Int. Cl. C01b *31/06*
U.S. Cl. 23—209.1 **5 Claims**

Diamond crystals are produced by subjecting to elevated temperatures and pressures a mixture of a nondiamond form of carbon together with a mixture or alloy of cobalt and phosphorus, which serves as the solvent and catalyst for the conversion to diamond form. Use of cobalt and phosphorus for solvent and catalyst allows conversion of nondiamond carbon to diamond at lower pressures than previously utilized, i.e., from about 42,200 to about 49,000 atmospheres.

3,607,061

MANUFACTURE OF SYNTHETIC DIAMONDS

John C. Angus, Cleveland Heights, Ohio, assignor to Case Western Reserve University

Filed June 26, 1968, Ser. No. 740,226
Int. Cl. C01b *31/06*
U.S. Cl. 23—209.1 **9 Claims**

There is provided an improvement on a low-pressure process for the growth of synthetic diamonds from diamond seed crystals by contacting them with a monocarbon atom gas which also contains a "doping agent" such as a compound of boron or aluminum or lithium vapor in the gas phase at a pressure of from 760 (Torr.) to 1×10^1 (Torr.) and at a temperature in the range of from 900° C. to 1450° C. and for deposition-cleaning cycle periods in the range of from 4 to 28 hours.

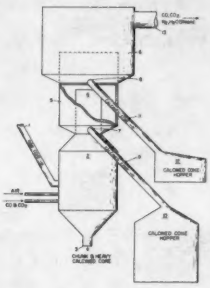
3,607,062

PROCESS AND APPARATUS FOR THE FLUIDIZED CALCINING OF COKE

Richard D. Sudduth, Cleveland Heights, Ohio, assignor to Marathon Oil Company, Findlay, Ohio

Filed June 18, 1969, Ser. No. 834,359
Int. Cl. C01b *31/02*; C10b *57/00*
U.S. Cl. 23—209.9 **5 Claims**

Controlled calcination of coke is accomplished by feeding raw coke, together with controlled amounts of oxygen and carbon monoxide, to maintain a calcining temperature in the range of from about 1,600° to about 3,200° F., and thereafter reducing the velocity of the gases which have fluidized the coke so as to separate the coke from said gases, preferably in



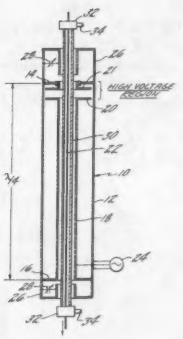
a manner which permits the separation of various particle size fractions of the calcined coke.

3,607,063

MANUFACTURE OF CARBON FILAMENTS OF HIGH STRENGTH AND MODULUS

Frank C. Douglas, Granby; Thomas K. Gregory, East Granby, and Robert W. Stielau, Portland, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Oct. 9, 1969, Ser. No. 865,119
Int. Cl. C01b *31/07*
U.S. Cl. 23—209.3 **4 Claims**



A method for continuously producing carbon strand of high tensile strength and modulus comprising passing carbonized filament through an electrically conductive enclosure, generating a current of radiofrequency in an oscillatory circuit connected to the enclosure and establishing an electric field axially oscillating at the radiofrequency within the enclosure of sufficient density to heat the carbon filament to graphitization temperature.

3,607,064

CARBON BLACK PRODUCTION

Robert E. Dollinger, and Glenn J. Forseth, both of Borger, Tex., assignors to Phillips Petroleum Company

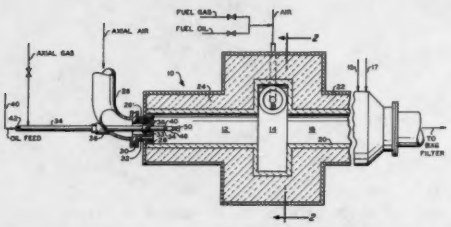
Filed Jan. 31, 1969, Ser. No. 795,679
Int. Cl. C09c *1/50*
U.S. Cl. 23—209.4 **8 Claims**

A method of controlling the property of a furnace produced carbon black by introducing with the preheated make-oil a property-affecting mixture having a melting point less than that temperature to which the make-oil is preheated.

3,607,065
PRODUCTION OF CARBON BLACK

Glenn J. Forseth, and Archie G. Smith, both of Borger, Tex., assignors to Phillips Petroleum Company

Continuation-in-part of application Ser. No. 515,139, Dec. 20, 1965, now abandoned. This application Sept. 30, 1968, Ser. No. 767,052
Int. Cl. C09c *1/50*
U.S. Cl. 23—209.4 6 Claims

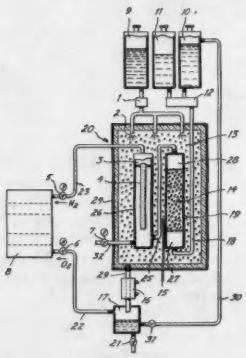


Process and apparatus for the production of carbon black by the pyrolytic decomposition of a hydrocarbon feed wherein the hydrocarbon feed is dispersed by impingement on a screen spaced apart from the feed nozzle in an oxygen-containing gas and the resulting mixture commingled with hot combustion gases whereby the hydrocarbon feed is pyrolytically decomposed to carbon black. Vaporous fuel is preferably introduced into admixture with the oxygen-containing gas.

3,607,066
PROCESS FOR THE PRODUCTION OF HYDROGEN AND OXYGEN GASES

Andreas Basch, Frankfurt, Niedereschbach, and Hans Hermann von Dohren, Frankfurt am Main, both of Germany, assignors to Varta Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 30, 1966, Ser. No. 576,008
Int. Cl. C01b *1/02, 1/27, 13/02*
U.S. Cl. 23—212 14 Claims



A process and apparatus for the simultaneous production of hydrogen and oxygen gases in which an oxygen generating compound is catalytically decomposed, the oxygen is separated and concurrently therewith a hydrogen generating compound is catalytically decomposed by means of the heat generated by the decomposition of the oxygen generating compound.

3,607,067
METHOD OF PRODUCING FILAMENTARY MONOCRYSTALS

Julius Nickl, Neukeferloh near Munich, Germany, assignor to Siemens Aktiengesellschaft

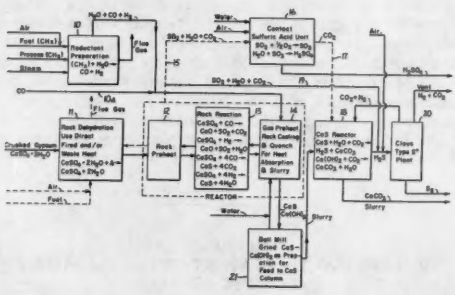
Continuation of application Ser. No. 548,014, May 5, 1966, now abandoned. This application Feb. 9, 1970, Ser. No. 009,114
Int. Cl. C01b *33/02*
U.S. Cl. 23—223.5 6 Claims

Described is an improvement in the method of producing filamentary monocrystals by precipitation of crystal substance from a vaporous compound in a reaction vessel at elevated temperature, which comprises supplying the reaction space in the vessel with a mist of droplets formed of seed material for the monocrystals to be produced, said droplet material having a melting point 50° to 500° C. below that of the monocrystals to be produced; maintaining said reaction space at a temperature between the respective melting points of said droplet material and said monocrystals; and contacting the vaporous compound in said reaction space with said mist of droplets, whereby filamentary monocrystals grow onto the droplets. Also described is apparatus for performing the method.

3,607,068
SULFUR RECOVERY PROCESS

Roy Edwin Campbell, and Edwin Eddie Fisher, both of Midland, Mich., assignors to Elcor Chemical Corporation, Midland, Tex.

Filed July 22, 1968, Ser. No. 746,643
Int. Cl. C01b *17/44, 17/50*
U.S. Cl. 23—224 9 Claims



A method of recovering sulfur from a metal sulfate whereby a substantial part of the sulfur content is recovered as sulfur dioxide and the balance as hydrogen sulfide. The sulfate is contacted with reducing gases at high temperatures to produce a metal sulfide and a metal oxide under conditions favoring an off-gas stream rich in sulfur dioxide; the metal sulfide may subsequently be converted to hydrogen sulfide and sulfur and sulfur compounds are recovered.

3,607,069

PROCESS FOR RECOVERING SULFUR AND METAL VALUES FROM SULFUR-BEARING MINERALS

Charles Patrick Bruen, Fayetteville, N.Y.; Donald Hoyt Kelly, Gladstone, N.J.; Christian Albert Wamser, Camillus, and Bhaskar Bandyopadhyan, Liverpool, N.Y., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Dec. 9, 1969, Ser. No. 883,651
Int. Cl. C01b *17/06*
U.S. Cl. 23—225 15 Claims

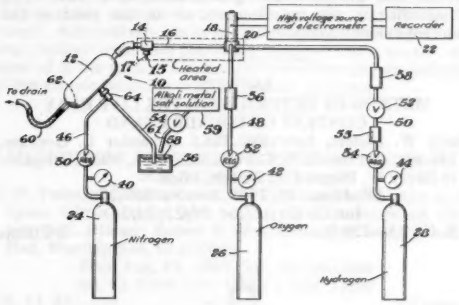
A process for recovering sulfur values and concentrating other metal values from pyrrhotite (FeS) by complexing ferrous sulfide in aqueous medium with an insoluble alkylamino polycarboxylic acid chelating agent to form a water-soluble ferrous chelate, hydrogen sulfide and a concentrate of insoluble sulfides of nonferrous metals. The hydrogen sulfide is reacted Claus sulfur dioxide under conventional Clause reaction conditions to yield sulfur. The ferrous chelate, in solution, is treated with an oxygen-free sulfur dioxide whereby the water-insoluble chelating agent is regenerated for recycle. The solution of ferrous bisulfite which forms is processed to yield additional quantities of sulfur dioxide from which sulfur is recovered.

3,607,070

METHOD AND APPARATUS FOR THE DETERMINATION OF PHOSPHORUS IN AQUEOUS SOLUTIONS

Vernon A. Stenger, and David N. Armentrout, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 4, 1970, Ser. No. 8,545
Int. Cl. G01n *31/12*
U.S. Cl. 23—230 R 17 Claims



A method and apparatus for directly determining inorganic phosphorus in water samples, comprising adding a very small amount of an alkali metal salt to the water solution containing the phosphorus compound, atomizing the water solution pneumatically, injecting the atomized particles into a flame ionization detector where interaction between the alkali metal and the phosphorus produces in the flame an enhanced ionization that is proportional to the phosphorus concentration.

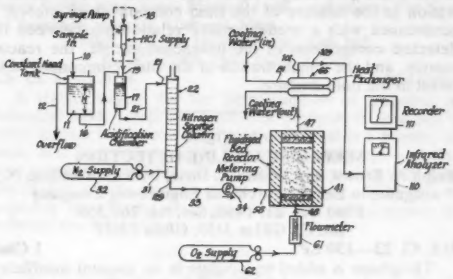
3,607,071

CONTINUOUS TOTAL ORGANIC CARBON ANALYZER AND METHOD

Herbert Kenneth Staffin, Colonia, and Roy J. Ricci, Red Bank, both of N.J., assignors to Procedyne Corporation, New Brunswick, N.J.

Filed Mar. 23, 1970, Ser. No. 21,884
Int. Cl. G01n *31/12*
U.S. Cl. 23—230 PC 14 Claims

Apparatus and method for receiving and analyzing a continuous stream constituting a sample of water or other fluid containing carbon-based organic and inorganic pollutants to determine the total content of pollutants in terms of carbon, and providing an instantaneous record of such content.



3,607,072

NOVEL CYSTEINE DERIVATIVE

Mendel Friedman, and James F. Cavins, both of Peoria, Ill.

Division of Ser. No. 758,151, Sept. 6, 1968, Pat. No. 3,607,072.
Filed Jan. 21, 1970, Ser. No. 8,112
Int. Cl. C07d *31/48*; G01n *31/08*
U.S. Cl. 23—230 R 1 Claim

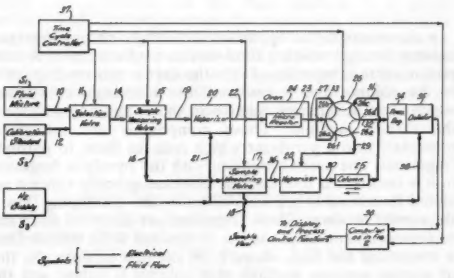
S-B-(4-pyridylethyl)-*L*-cysteine, a novel amino acid produced by reacting *L*-cysteine and 4-vinylpyridine in the presence of triethylamine, is ninhydrin-positive and very highly resistant to acid hydrolysis. It is particularly useful as an internal standard for chromotographic analyses of basic amino acids.

3,607,073

METHOD AND APPARATUS FOR ANALYSIS OF FLUID MIXTURES

Ralph E. Stamm, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.

Filed July 22, 1968, Ser. No. 746,487
Int. Cl. G01n *31/08, 31/10*
U.S. Cl. 23—230 R 15 Claims



A method and apparatus for continually monitoring a component of a fluid mixture, such as the naphthene content of a hydrocarbon mixture. The apparatus includes a microreactor for subjecting the fluid mixture to a chemical reaction converting, at least in part, a fluid component of the mixture so as to render the fluid component of interest separable from the mixture, and detection means for detecting the fluid component of interest. In a further embodiment a unique computer is provided coupled with the detector for computing the concentration of the fluid component of interest in the fluid mixture. The method of the invention includes reacting the fluid mixture in the aforementioned chemical reaction, and detecting the fluid component of interest. In another version of the method in which the reaction affects more than one component of the mixture converting the affected components to still another component of the

mixture, the method includes the further steps of detecting said other component in an unreacted sample of the fluid mixture and generating a signal representative of the concentration in the mixture of the fluid component of interest in accordance with a predetermined relationship between the detected components of the unreacted sample, the reacted sample, and the concentration of the fluid component of interest in the fluid mixture.

3,607,074

SEEPAGE GASOLINE DETECTION

Ralph A. Brown, and Walter A. Dietz, both of Westfield, N.J., assignors to Esso Research and Engineering Company

Filed Oct. 21, 1968, Ser. No. 769,398
Int. Cl. G01m *3/20; G01n 33/22*
U.S. Cl. 23—230 EP **1 Claim**

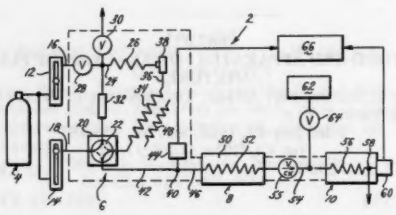
Thiophane is added to gasoline in an amount insufficient to change the odor of the gasoline, but sufficient to be detected when a sample of seepage gasoline containing the thiophane is subjected to a physical separation process, such as gas chromatography. Preferably, the amount of thiophane added to the gasoline is about 0.1 percent by volume of the fuel.

3,607,075

INSTRUMENT AND METHOD FOR ANALYZING COMPLEX SUBSTANCES

Clarence J. Wolf, St. Louis County, Mo., and John Q. Walker, Madison County, Ill., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Aug. 9, 1968, Ser. No. 751,563
Int. Cl. G01n *31/08*
U.S. Cl. 23—230 **11 Claims**



A chromatographic apparatus including a chromatographic column through which a fluid carrier medium flows. A complex mixture is introduced into the carrier gas medium prior to the column and is resolved into individual compounds which elute at separate times with the continuing passage of the carrier medium. These compounds are introduced separately into a pyrolyzer which reduces them to pyrolytic fragments. The carrier medium with the pyrolytic fragments in it is introduced into another chromatographic column and eluted therefrom at separate times by the continuing flow of the carrier medium. These fragments are detected and cause a chromatogram unique to the compound to be traced. Once a compound has been eluted from the first column, the flow of carrier medium through that column is halted and that column is isolated from the pyrolyzer and second column so that other compounds will not elute and interfere with the pyrolytic fragments from the prior compounds.

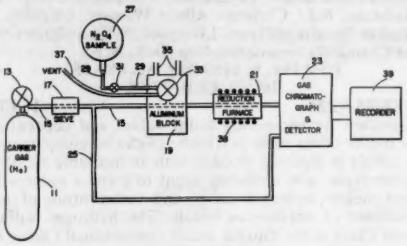
3,607,076

PROCEDURE AND APPARATUS FOR DETERMINATION OF WATER IN NITROGEN TETROXIDE

T. O. Paine, Acting Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Raffaele F. Muraca, Los Altos Hill, Calif.

Filed Feb. 18, 1969, Ser. No. 800,204
Int. Cl. G01n *31/08, 31/12*
U.S. Cl. 23—230 R **7 Claims**

Nitrogen tetroxide is analyzed for water content by passing it through hot copper contained in a column wherein all nitrogen and hydrogen containing compounds are converted quantitatively to nitrogen and water. The resultant material from the column is then passed into a gas chromato-



graph whereupon the amount of water initially contained in the nitrogen tetroxide can be determined.

3,607,077

COMPOSITIONS OF AGREEABLE ODOR FOR THE DETERMINATION OF ALDOSES

Arnold Hartel; Roland Helger, and Hermann Lang, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Apr. 29, 1969, Ser. No. 820,289
Claims priority, application Germany, May 2, 1968, P 17 73 330.1
Int. Cl. G01n *21/06*
U.S. Cl. 23—230 B **22 Claims**

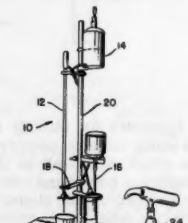
To eliminate the obnoxious odor associated with the *o*-toluidine-glacial acetic method of conducting aldose, especially blood glucose determinations, the color reagent is modified to include at least one hydroxycarboxylic acid, e.g. glycolic acid and little or no glacial acetic acid, there being no sacrifice in the reaction rate or in the yield of the resultant colored compound.

3,607,078

METHOD OF DETERMINING THE LIVE CLAY CONTENT OF FOUNDRY SAND

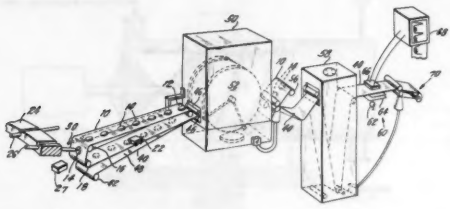
Harry W. Dietert, Kerrville, Tex.; Alexander L. Graham, Livonia, and Harold V. Gervais, Dearborn, Mich., assignors to Harry W. Dietert Co., Detroit, Mich.

Filed Sept. 19, 1969, Ser. No. 859,276
Int. Cl. G01n *1/04, 31/22, 33/24*
U.S. Cl. 23—230 R **8 Claims**



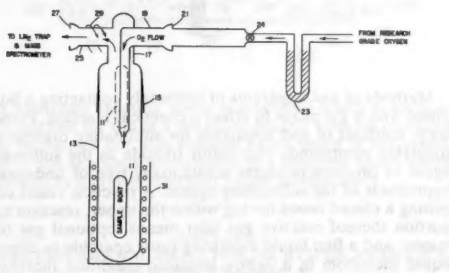
A 2 percent preliminary solution of tetrasodium pyrophosphate is added to foundry sand containing a blend of bentonites and the clay-bearing sand sample and preliminary solution are stirred lightly. The mixed sand sample and tetrasodium pyrophosphate are then titrated with methylene blue until a blue-green halo is left around a spot on a filter paper on which a drop of the titrated solution is placed. The quantity of methylene blue necessary for the titration is an accurate indication of the effective live clay content of the sand without regard to different base exchange capacities of different bentonites in the blend.

3,607,079
ANALYSIS ARRANGEMENT FOR CHEMICAL ANALYZING APPARATUS
Theodore Maxon, Elmhurst, and Lowell A. Kleiman, Roslyn, both of N.Y., assignors to Scientific Industries, Inc., Hempstead, N.Y.
Filed June 2, 1969, Ser. No. 829,562
Int. Cl. G01n *1/00, 1/28, 21/00*
U.S. Cl. 23—230 R **23 Claims**



For use in a chemical-analyzing apparatus, a liquid sample analysis arrangement, comprising a liquid sample receiving, holding and transferring strip medium comprising an elongated tape having a plurality of spaced, uniformly dimensioned, liquid sample absorbing locations on one face thereof; and an analyzing strip medium comprising an elongated tape to which sample from the absorbent locations is transferred, and which analyzing medium has reagent applied to it to react with the transferred liquid sample; the analyzing apparatus comprising means for feeding and taking up the above noted strip mediums, means for dispensing liquid sample to the receiving medium, means for causing the transfer of liquid sample from the receiving to the analyzing medium and means for cooperating with the analyzing medium for analyzing the reaction between the reagent and the liquid sample. Alternatively, reagent can be caused to travel to the strip medium which has previously received liquid sample, instead of in the reverse direction and reaction on and analysis of this sample receiving medium will be performed.

3,607,080
METHOD FOR DETERMINING PRESENCE OF OH IN MAGNESIUM OXIDE
T. O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of; Ellsworth R. Blosser; Robert B. Iden, Columbus, and Elton H. Hall, Worthington, all of Ohio
Filed Aug. 11, 1969, Ser. No. 848,805
Int. Cl. C01f *5/06;* **G01n** *25/56, 33/00*
U.S. Cl. 23—230 **7 Claims**

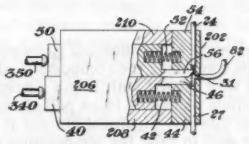


A method for determining the amount and type of OH present in MgO, comprising heating the MgO in a series of steps of successively higher temperatures, with a final step utilizing an oxygen atmosphere and a temperature above the decomposition temperature of the compound $Mg(OH)_2$ and measuring the amount of water vapor evolved in each step.

3,607,081
REAGENT FOR DETERMINATION OF GLOBULIN
Harry Goldenberg, Santa Monica, Calif., assignor to The Dow Chemical Company, Midland, Mich.
Filed Aug. 11, 1969, Ser. No. 849,202
Int. Cl. C09k *3/00;* **G01n** *21/02*
U.S. Cl. 23—230 B **10 Claims**

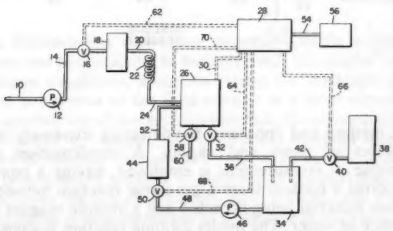
A stable reagent for the determination of globulins in biological fluids comprises a solution of glyoxylic acid and a cupric salt such as cupric sulfate pentahydrate in a mixture of acetic acid and sulfuric acid. The reagent has improved stability, sensitivity and specificity properties and can be employed for rapid determination of globulin. Methods of preparing the reagent and using it in the determination of globulins are disclosed.

3,607,082
FLUID-PROCESSING SYSTEM
Ralph E. Thiers, Woodland Hills, Calif., assignor to Bio-Science Laboratories, Van Nuys, Calif.
Continuation-in-part of application Ser. No. 541,306, Apr. 8, 1966, now Patent No. 3,475,128, dated Oct. 28, 1969. This application Sept. 24, 1969, Ser. No. 860,775
Int. Cl. B01l *3/02;* **G01n** *1/14, 31/00*
U.S. Cl. 23—230 **29 Claims**



A fluid-processing apparatus and a method for its use comprises metering and valving means for charging a plurality of separate liquids into separate pipet chambers and charging the liquids from the pipet chambers so that each succeeding liquid passes through the pipet chamber employed to receive the preceding liquid, a fluid receiving and transporting conduit having tractable wall portions adapted to receive the metered liquids from the pipets, means for forming movable seals in the conduit thereby to isolate a metered quantity of liquid in a hydraulically isolated chamber, means for mixing the fluids in the chamber by compressing and releasing portions of the wall thereof, processing means for performing various unit processes on the fluid mixture in a given chamber, and discharge means for removing fluid mixture from said conduit. A branched-arm valve, fitted with means for selectively closing arms thereof is preferably employed as a valving means in charging and dispensing fluids into and from the pipet chambers. The system can be employed in carrying out various processes of chemistry, microbiology or the like.

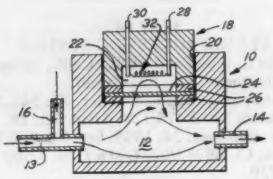
3,607,083
ANALYSIS OF KRAFT LIQUORS
Anirudh K. Chowdhry, Flushing, N.Y., assignor to Westvaco Corporation, New York, N.Y.
Filed Nov. 18, 1969, Ser. No. 877,745
Int. Cl. G01n *27/26*
U.S. Cl. 23—230 R **5 Claims**



Kraft cooking liquors used in the pulping of wood are analyzed for apparent causticity by utilizing conductivity

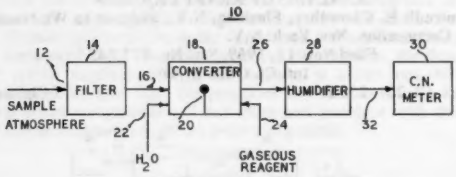
measurements taken before and after precipitation of the soluble carbonates in the liquors. The differential conductivity determined correlates directly with the apparent causticity of the cooking liquor.

3,607,084
COMBUSTIBLE GAS MEASUREMENT
Robert J. Mackey, Morton Grove, and Ihor B. Karpowycz, Chicago, both of Ill., assignors to Sun Electric Corporation
Filed Dec. 2, 1968, Ser. No. 780,476
Int. Cl. B01j *11/12*; **G01n** *31/10, 31/12*
U.S. Cl. 23—232 **21 Claims**



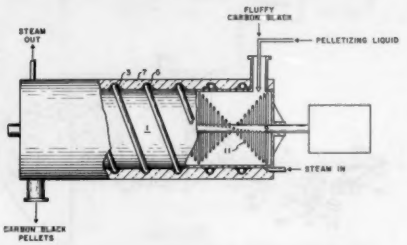
The measurement of combustible gases comprises passing a stream of gas containing the combustible gases over a conductive metal wire coated with a thin catalytic coating of a mixture of thorium oxide and black palladium powder and/or black platinum powder. Electrical current is passed through the conductor wire to raise the temperature of the wire to a first temperature at which the oxidation of the combustible gases is initiated in the presence of the catalytic effect produced by the coating. The oxidation of the combustible gases substantially elevates the temperature of the conductor wire, changing its electrical resistance, the amount of heat generated during oxidation being directly proportional to the quantity of combustible gases in the gas stream. The metal conductor wire is preferably formed of a base metal in which the change in resistivity between the first and elevated temperatures is substantially equal to or greater than the change in resistivity of platinum between those temperatures.

3,607,085
METHOD AND APPARATUS FOR DETECTING GASES OR VAPORS
Serafino J. Fusco, Pittsfield, Mass., assignor to General Electric Company
Filed Aug. 29, 1969, Ser. No. 854,194
Int. Cl. G01n *31/00, 33/00*
U.S. Cl. 23—232 R **9 Claims**



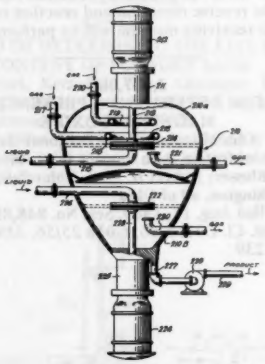
A method and apparatus for detecting extremely minute quantities of gases and vapors. A condensation nuclei technique of measurement is employed, having a converter that forms a nucleus from a gas-phase reaction between the gaseous material being detected and a volatile reagent in the presence of water. The nuclei forming reaction is augmented by providing a corona discharge in the converter. The reacting materials can be introduced separately or in combination to the converter.

3,607,086
APPARATUS FOR WET-PELLETIZING CARBON BLACK
George W. Dingus, 1821 Mary Ellen St., Pampa, Tex.
Continuation-in-part of application Ser. No. 796,146, Feb. 3, 1969, now Patent No. 3,528,785. This application Feb. 24, 1970, Ser. No. 13,332
Int. Cl. B01f *7/04*; **C01b** *31/14*; **B01j** *2/00*
U.S. Cl. 23—252 **2 Claims**



A wet pelletizer apparatus suitable for the preparation of carbon black pellets wherein heating of the pelletizer during agitation of the carbon black is accomplished by external heating means.

3,607,087
GAS-LIQUID CHEMICAL REACTION APPARATUS
Ward A. Graham, Kansas City, Mo., assignor to Stratford Engineering Corporation, Kansas City, Mo.
Division of Ser. No. 363,758, Apr. 30, 1964, abandoned. Filed Oct. 15, 1969, Ser. No. 866,583
No. 866,583
Int. Cl. B01 ; B01j ; B01d *1/16*
U.S. Cl. 23—252 **7 Claims**

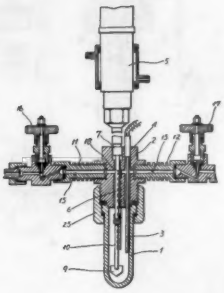


Methods of and apparatus of intimately contacting a liquid phase with a gas phase to effect a chemical reaction. Particularly, methods of and apparatus for sulfonating organic sulfonatable compounds with sulfur trioxide as the sulfonating agent to produce products substantially free of undesirable byproducts of the sulfonating agents. A reaction vessel comprising a closed vessel having within the upper, reaction zone portion thereof reactive gas inlet means, optional gas blast means, and a first liquid atomizing rotor operable to disperse liquid therefrom in a lightly atomized condition thereby to provide a substantially continuous screen of dispersed liquid across the full section of the vessel. A vapor withdrawal line is positioned beneath the first liquid atomizing vapor. The vessel also optionally includes a second liquid atomizing rotor beneath the first liquid atomizing rotor to provide a second gas-liquid contacting or liquid-liquid contacting operation. A bottom product line permits withdrawal of the products from the reaction vessel.

3,607,088
APPARATUS FOR SIMULTANEOUSLY MEASURING TEMPERATURE OF REACTION AND PRESSURE IN VAPOR AND LIQUID PHASES OF VERY SMALL AMOUNT OF SAMPLE UNDER PRESSURE

Teruji Ishii, Tokyo, Japan, assignor to Cobble Company Limited, Tokyo, Japan

Filed Sept. 10, 1968, Ser. No. 758,758
Claims priority, application Japan, Mar. 22, 1968, 43/18705
Int. Cl. G01n *25/22, 25/30, 31/00*
U.S. Cl. 23—253 14 Claims

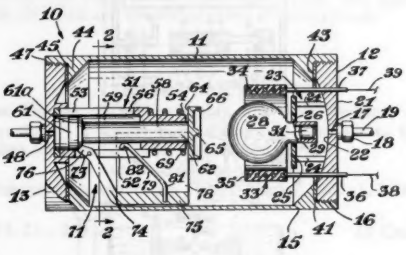


Disclosure is made of a method for simultaneously measuring and recording very slight changes in temperature and pressure of a very small mass or volume of a test sample under pressure, and of an apparatus therefor provided with a microautoclave applicable to both vapor and liquid phases, an electric furnace in which said microautoclave is adapted to fit and an automatic recorder containing an electric circuit necessary for achievement of the above-mentioned measurement.

3,607,089
MINIATURE REACTION VESSEL

Paul Richard Stoesser, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sept. 30, 1969, Ser. No. 862,435
Int. Cl. G01n *25/20, 31/20*
U.S. Cl. 23—253 R 6 Claims



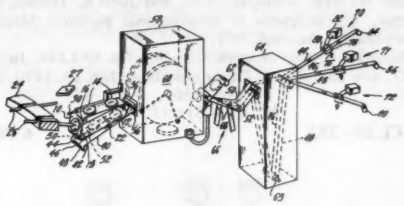
A miniature reaction vessel is described which is particularly suitable for use in a microcalorimeter wherein reactions may be carried out with minimal vapor space in the vessel. One of the reactants is contained in a frangible vessel which is broken by a gravity-operated trigger mechanism.

3,607,090
ANALYSIS ARRANGMENT FOR MULTIPLE ANALYSES OF A SINGLE SAMPLE

Theodore Maxon, Elmhurst, N.Y., assignor to Scientific Industries, Inc., Hempstead, N.Y.

Filed Oct. 6, 1969, Ser. No. 863,943
Int. Cl. G01n *1/00, 1/28, 21/00*
U.S. Cl. 23—253 R 25 Claims

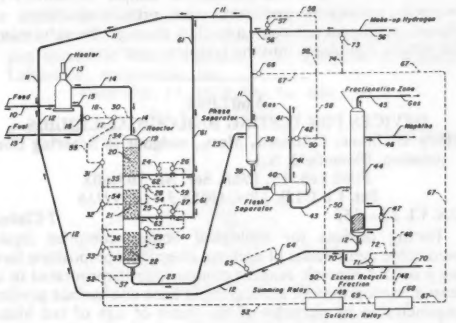
A liquid sample analysis arrangement comprising a liquid sample receiving, holding and transferring strip medium made from an elongated tape having a plurality of spaced liquid sample absorbing locations on one face thereof, and an analyzing strip medium comprising an elongated tape which is divided into a plurality of discrete analyzing portions; said arrangement may be used in conjunction with an analyzing apparatus comprising means for dispensing liquid sample to the receiving medium and means for causing transfer of the dispensed liquid sample to a plurality of the discrete portions of the analyzing medium, whereby a separate analysis of a single liquid sample may be performed on each of the discrete portions of the analyzing medium; an alternate embodiment of analysis arrangement has sample dispensed to the receiving medium and has a reagent on each discrete portion of the other strip medium, with the reagent from each portion of the latter medium being transferred by the analyzing apparatus to the former medium so that discrete analyses are performed on the former medium; in a still further embodiment, the sample-receiving medium is also divided into a plurality of discrete portions, so that back transfer of each reagent, as in the alternate embodiment, is only to one discrete portion of the receiving medium.



3,607,091
TEMPERATURE CONTROL SYSTEM FOR HYDROCARBON CONVERSION PROCESS

David M. Boyd, Clarendon Hills, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of application Ser. No. 759,104, Sept. 11, 1968. This application Nov. 28, 1969, Ser. No. 880,654
Int. Cl. B01j *9/04*; C10g *13/00, 37/02*
U.S. Cl. 23—253 14 Claims



In a hydrocarbon conversion process wherein a gaseous reactant and hydrocarbon to be converted, are reacted under conversion conditions, a control system for maintaining the level of conversion of the feed mixture at a level responsive to the availability of the gaseous reactant. Conversion severity is adjusted by temperature control on the feed mixture, reset by differential temperature control across the reaction zone. Unconverted product is recycled to the reaction zone from a lower section of a fractionation column, and a level control signal is sent therefrom to a selector relay which also receives a signal indicative of the pressure within the reaction zone. The selector relay develops an output signal which is a function of the pressure signal when the pressure is below a

predetermined level, and which is a function of the level signal when the pressure is at or above the predetermined level. The selector output signal is sent to a summing relay which also receives a flow signal indicative of the flow of makeup reactant gas to the process of net gas product leaving the process. The summing relay then resets the differential temperature controller which in turn resets the temperature controller.

3,607,092

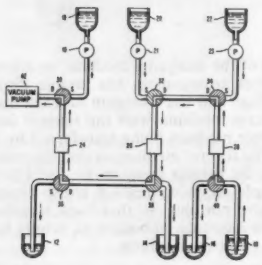
AUTOMATIC FLUID SAMPLE APPARATUS

Gordon W. Neff, Mahopac, N.Y., and John E. Tomko, Shelburne, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of application Ser. No. 653,141, July 13, 1967, now abandoned. This application Mar. 23, 1970, Ser. No. 21,561

Int. Cl. G01n *33/16*

U.S. Cl. 23—253 **6 Claims**



An automatic fluid sample apparatus for the chemical analysis of fluids is described. In the apparatus, a plurality of samples are substantially simultaneously precisely measured out and diluted or mixed with the proper quantity of diluent and/or reagent. A series of tubing valves, preferably of the T-type, in one position permit sample containers having the desired sample volume to be filled with samples of fluid to be analyzed from a fluid source through the action of a vacuum pump. The valves are then placed in a second position whereby the samples flow from the sample containers to recipient containers and respective proper quantities of diluent or reagent are caused to flow through the valves and the sample containers into the recipient containers.

3,607,093

DEVICES FOR TESTING BIOLOGICAL LIQUIDS

Ellery W. Stone, Cohassett, Mass., assignor to Schering Corporation, Bloomfield, N.J.

Filed Feb. 15, 1968, Ser. No. 705,603

Int. Cl. C12k *1/04*; **G01n** *31/14, 33/16*

U.S. Cl. 23—253 **7 Claims**

Testing devices for biological liquids comprise liquid permeable membranes of uniform chemical composition having a solid diagnostic reagent composition incorporated in at least a portion thereof and having at least one surface portion impenetrable by particles of the order of size of red blood corpuscles. The membranes may be of substantially uniform porosity throughout or they may have a thin skin portion of low effective porosity and a thicker body portion having pores of substantially large effective diameters.

3,607,094

APPARATUS FOR PIPETTING AND ADDING A LIQUID

Palle-Finn Beer, Lidingo, Sweden, assignor to AB Autokemi, Stockholm, Sweden

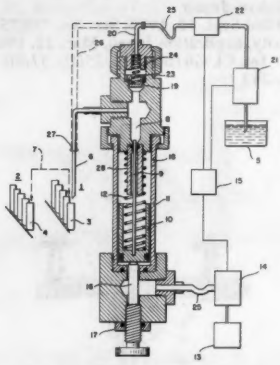
Filed Jan. 27, 1969, Ser. No. 793,990

Claims priority, application Sweden, June 25, 1968, 1020/68

Int. Cl. B01l *11/00*; **G01n** *1/14, 31/00*

U.S. Cl. 23—253 **3 Claims**

An apparatus for pipetting a liquid sample and supplying a liquid reagent which comprises a pump cylinder, a pump piston insertable in said pump cylinder, actuating means for said pump piston, a tubular cannula connected to said pump cylinder for drawing up a liquid sample, a conduit for supplying liquid reagent to said pump cylinder, said conduit having provided therein a valve means adapted to be actuated to its open position when the pump piston reaches a position corresponding to an emptying of the pump cylinder.



3,607,095

APPARATUS FOR DOSING A LIQUID OR GASEOUS FLUID BY COMPARISON

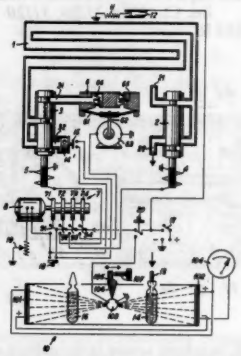
Lucien Etzlinger, 12 rue de Hesse, 1204 Geneva, Switzerland

Filed Oct. 7, 1968, Ser. No. 765,456

Claims priority, application Switzerland, Oct. 9, 1967, 14062/67

Int. Cl. F17d *3/00*; **G01n** *1/22, 21/24*

U.S. Cl. 23—254 R **6 Claims**



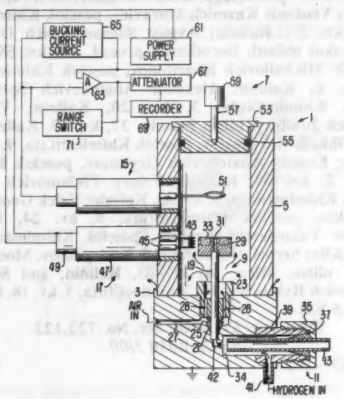
Apparatus for measuring a liquid or gaseous fluid by comparison, comprising a duct, means for effecting the automatic rinsing out of the duct by means of a neutral fluid, the filling of the duct with the fluid to be analyzed, and the automatic emptying of the duct into an analyzing receiver, means for checking the filling comprising a valve device automatically put into service during the filling and ensuring that the cycle proceeds or is stopped according to whether the filling is effected or not, and automatically put out of service after a predetermined time interval chosen in such a way that the duct contains none but the fluid to be analyzed, and a device for measuring the fluid contained in the said receiver by comparison.

3,607,096

ALKALI FLAME IONIZATION DETECTOR HAVING CAP MEANS FOR CHANGING THE GAS FLOW PATTERN

Charles H. Hartmann, 1048 Sanders Drive, Moraga, Calif.

Filed June 25, 1969, Ser. No. 836,350
Int. Cl. G01n 31/12
U.S. Cl. 23—254 E 5 Claims



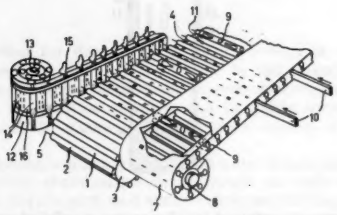
A hollow flame jet is supported on a base member and surrounded by a cylindrical chimney. The outlet end of a chromatographic column extends into a mixing chamber in the base member where the effluent vapors from the column are mixed with hydrogen. This mixture issues from the flame jet and is burned in the presence of an alkali salt contained in a cup surrounding the tip of the jet. Air to support this combustion enters the chimney at the base of the flame jet. A pair of electrodes positioned near the jet are connected to a fixed voltage power supply and electrometer circuit in order to cause a current to flow in the interelectrode space and to measure this current. The magnitude of this current is proportional to the density of ions in the interelectrode space. Since nitrogen phosphorus-, sulfur-, and chlorine-containing hydrocarbon compounds produce relatively high currents compared with other hydrocarbon compounds, they can be reliably detected and quantified in the effluent stream.

3,607,097

ANALYZER FOR LIQUID SAMPLES

Michel Auphan, d'Orleans-Neuilly, and Jean Perilhou, Arnoux-Bourg la Reine, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 6, 1968, Ser. No. 750,654
Claims priority, application France, Aug. 9, 1967, 117,367
Int. Cl. G01n 1/14; 33/16
U.S. Cl. 23—259 10 Claims



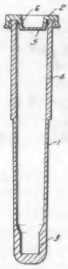
An apparatus for automatically transporting a plurality of liquid samples, such as blood through a series of programmed steps for colorimetric analysis of the samples. A first conveyor belt carries the samples to be analyzed, an adjacent belt carries working tubes in which the tests occur, and a third belt carries substances to be added to the samples during the tests. Needles and tubes are provided between the containers of substances on the three belts for piercing container walls and then transferring liquids between the containers.

3,607,098

CONTAINERS FOR LABORATORY USE

Carl Sloth Strande, Aurikeluej 9, DK-2500 Valby, Denmark

Filed Oct. 17, 1968, Ser. No. 768,229
Claims priority, application Denmark, Oct. 23, 1967, 5259/67
Int. Cl. B01l 3/14; B65d 41/20
U.S. Cl. 23—259 6 Claims



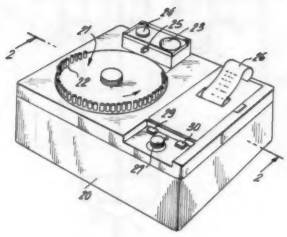
A container having an upper open end through which the container can be filled with liquid, such as a specimen of blood, and a closure fluid-tightly closing the open end of the container. The closure has a portion within the opening which is pierceable by a sedimentation tube or the like and the portion of the closure within the opening is constructed to close fluid-tightly about the outer surface of the tube when the latter is pushed through the closure.

3,607,099

PROTHROMBIN TIME MEASURING APPARATUS

Emil A. Scordato, Bronxville; John J. Hartnett, Bronx, N.Y., and Robert J. Varca, Palisade, N.J., assignors to Medical Laboratory Automation, Inc.

Filed Mar. 11, 1969, Ser. No. 806,120
Int. Cl. G01n 33/16
U.S. Cl. 23—259 10 Claims



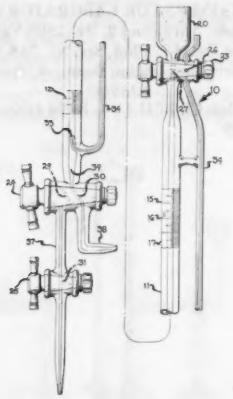
A prothrombin time measuring apparatus having a turntable that moves a plurality of plasma-containing test tubes successively to a testing station where a photosensitive device responds to a change in optical density of the plasma and a reagent mixed therewith at the testing station. Refrigerating means keep the plasma at a low temperature until the plasma is to be tested whereupon heating means increase the temperature to normal blood temperature.

3,607,100

CONSTANT FLOW RATE BURETTE

Hardy C. Croom, Valdosta, Ga., assignor to Owens-Illinois, Inc.

Filed July 2, 1969, Ser. No. 838,385
Int. Cl. G01f 1/00
U.S. Cl. 23—259 5 Claims



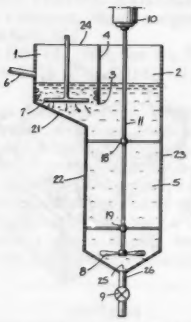
A burette assembly for discharging liquids at a constant flow rate regardless of the height of solution in the burette. This result is accomplished by attaching a capillary tube to the wall of a conventional burette. The tube is vented to the atmosphere at one end and terminates at the other end at a point on the inside of the bottom portion of the barrel of the burette.

3,607,101

COMBINED TANK REACTOR ASSEMBLY

Linden Wayne Cochran, Basking Ridge, N.J., assignor to Multi-Minerals Limited, Toronto, Ontario, Canada

Filed Dec. 31, 1968, Ser. No. 788,289
Int. Cl. B01d 9/02
U.S. Cl. 23—260 2 Claims



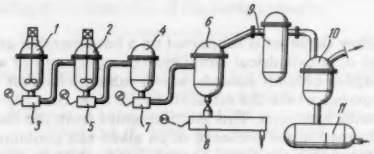
A combined tank reactor and crystallizer assembly which comprises a small reactor section and a large crystallizer section. The reactor section has means to heat and agitate the reaction medium to provide optimum conditions for the reaction to proceed. Underflow passage means between the two sections enables products from the reactor section to flow into the crystallizer section.

3,607,102

APPARATUS FOR THE CONTINUOUS PRODUCTION OF POLYCAPROAMIDE

Boris Afanasievich Kharkov, poselok Khiminstituta, 4, kv. 22, Kalinin; Iosif Zalmanovich Kunin, poselok, Khiminstituta, 2, kv. 5, Kalinin; Vladimir Nikolaevich Skufiin, prospekt Pobedy, 25, kv. 7, Kalinin; Gleb Konstantinovich Moiseev, poselok Khiminstituta, 10, kv. 4, Kalinin; Vladimir Nikolaevich Vysotsky, poselok Khiminstituta, 3, kv. 1, Kalinin; Vladimir Kuzmich Muraviev, poselok Khiminstituta, 6, kv. 27, Kalinin; Avgust Alexandrovich Dubynin, Moskovskoi oblasti, Borodinsky proezd, 30, kv. 59, Klin; Vladimir Mikhailovich Kharitonov, poselok Khiminstituta, 10, kv. 6, Kalinin; Alexandr Anatolievich Speransky, poselok Khiminstituta, 3, kv. 20, Kalinin; Vsevolod Pavlovich Junitsky, ulitsa Pravdy, 37, kv. 17, Kalinin; Evgeny Mikhailovich Kozlov, poselok Khiminstituta, 9, kv. 16, Kalinin; Evgeny Anatolievich Gryaznov, poselok Khiminstituta, 2, kv. 34, Kalinin; Valery Tikhonovich Bykov, poselok Khiminstituta, 3, kv. 43, Kalinin; Erick Georgievich Podushkin, poselok Khiminstituta, 9, kv. 24, Kalinin; Vladimir Yakovlevich Streitses, poselok Khiminstituta, 3, kv. 28, Klin; Sergei Alexandrovich Kudryashov, Moskovskoi oblasti, ulitsa, Mira, 16, kv. 33, Kalinin, and Stanislav Semenovich Rybin, poselok Khiminstituta, 3, kv. 18, Kalinin, all of U.S.S.R.

Filed Apr. 17, 1968, Ser. No. 722,123
Int. Cl. B01d 3/00
U.S. Cl. 23—263 1 Claim



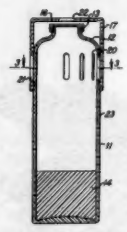
An installation for the continuous production of polycaproamide comprises the following units connected in series in the order given: a unit for melting caprolactam; a unit for mixing the molten caprolactam with an activator and a stabilizer; a unit for continuous polymerization of caprolactam; a unit for distilling off low-molecular compounds; a unit for catalytic decomposition of cyclic oligomers of caprolactam; and a unit for condensation of low-molecular compounds.

3,607,103

CHEMICAL DISPENSER FOR SWIMMING POOLS

Adolph Kiefer, 2051 Railroad Ave., Northfield, Ill.

Filed Jan. 23, 1970, Ser. No. 5,223
Int. Cl. B01d 11/00
U.S. Cl. 23—267 A 16 Claims

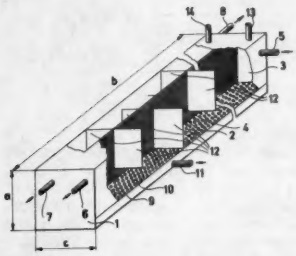


A buoyant container for dispensing a solid chemical composition while floating on the surface of a liquid has a compartment for confining the chemical composition arranged with respect to the center of buoyancy so that the attitude of the container when empty is substantially different than the attitude of the container when the compartment is filled.

3,607,104
APPARATUS FOR INTENSIFIED CONTACTING OF PLURAL FLUIDS

Tibor Blickle, Budapest; Laszlo Balla, Veszprem, and Laszlo Bacs, Budapest, all of Hungary, assignors to Magyar Tudomanyos Akademia Muszaki Kemiai Kutato Intezete, Veszprem, Hungary

Filed July 29, 1968, Ser. No. 748,404
Claims priority, application Hungary, Aug. 1, 1967, MA-1745
Int. Cl. B01d *11/02, 13/00;* B01f *3/04*
U.S. Cl. 23—267 6 Claims

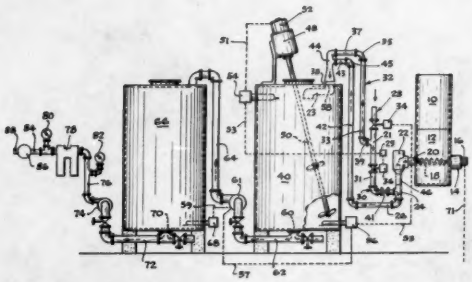


Different fluids are fed to equipment having at least two chambers separated by a wall having fine perforations, further preferably also separated spaces. The operation is effected by contacting these streams of different components through the partition wall. Liquids are preferably transformed into foams and solids fluidized during the process.

3,607,105
AUTOMATIC SOLVENT ASPIRATED POWDER FEEDER-DISSOLVER

George Reid, Olympia Fields, and William R. Watson, Oak Lawn, both of Ill., assignors to Nalco Chemical Company, Chicago, Ill.

Filed Aug. 22, 1969, Ser. No. 852,358
Int. Cl. B01f *1/00, 5/04*
U.S. Cl. 23—267 R 4 Claims



A method for dissolving chemical powders in water to make lump-free solutions is afforded by this invention. The invention provides a method and an apparatus whereby water solutions of chemical powders can be easily formed. The method used to accomplish these results consists of the following:

1. Supplying a quantity of water to water supply port.
2. Feeding chemical powders through an outlet and into the water supply port, said water supply port having a supply assembly and a suction assembly fitted with aspirators to prevent backsplash and to draw the chemical powder into the water through the water supply port.
3. Mixing the chemical powders in the water in the water supply port to form a premixed slurry.
4. Discharging the premixed slurry into a mixing tank.
5. Filling a mixing tank and actuating a mixing means and a timer when the tank is filled to form a chemical solution.
6. Transferring the mixed solution to a storage tank by means of a transfer pump.
7. Pumping the chemical solution from the storage tank through a discharge.

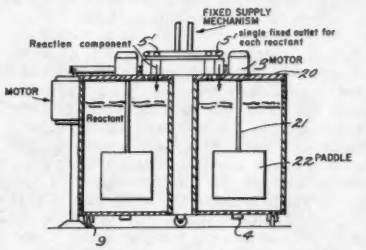
The apparatus used to accomplish the above method comprises:

1. A feeding chamber having an outlet.
2. A water supply port, comprising:
A. a suction assembly having ends,
B. a supply assembly having ends,
C. two aspirators adapted to fit said ends of said suction assembly and the supply assembly,
D. an automatic valve positioned in the supply assembly, and
E. a delayed actuated automatic valve positioned between the suction assembly and the supply assembly.
3. A mixing tank capable of holding a chemical solution, comprising:
A. a mixing means for the tank,
B. an upper liquid level sensing means to close the automatic valve and the delayed actuated automatic valve,
C. a lower liquid level sensing means to open said automatic valve and said delayed actuated automatic valve,
D. an inlet adapted to receive said aspirator of said supply assembly of said water supply port, and
E. an outlet.
4. A transfer pump adapted to remove said chemical solution from said mixing tank through the outlet and deenergized by said lower liquid level sensing means of the mixing tank.
5. A storage tank adapted to receive the chemical solution from the transfer pump having a lower liquid level sensing means to actuate said transfer pump and having an outlet.
6. A metering pump being deenergized manually, and having an outlet for discharge of the chemical solution.

3,607,106
APPARATUS FOR CARRYING OUT CONTINUOUS PROCESS HAVING A FIXED PROCESS DURATION WITH INDIVIDUAL REACTANTS AS WELL AS HOMOGENOUS CONCENTRATION CHANGE OF THE REACTION MASS

Hartmut Rainier Hetzel, Eichenweg 7, 4047 Dormagen-Horrem, Germany

Filed July 28, 1969, Ser. No. 848,137
Claims priority, application Germany, Aug. 29, 1968, P 17 92 404.8
Int. Cl. C01f *1/02*
U.S. Cl. 23—269 4 Claims



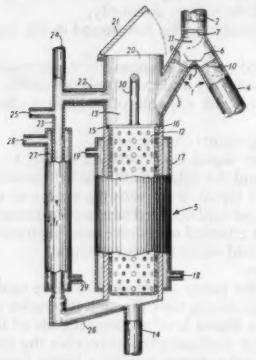
An apparatus is provided for carrying out a reaction process of fixed duration which also requires a homogeneous concentration change of the reaction mass. The apparatus includes a rotatably mounted, vertical, cylindrical container separated into a plurality of cells by radial walls. Stirring means are provided in each cell. Fixed supply means are mounted over the container for continuously supplying reactants during a portion of the rotation to the individual cells. Each cell has an outlet for emptying its contents when reaction is complete.

3,607,107

PLURAL SPENT-REACTOR-FUEL DISSOLVERS HAVING SELECTIVE FEED MEANS

Arnold L. Ayers, Convent Station, N.J., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Sept. 4, 1968, Ser. No. 777,933
Int. Cl. B01d 11/02
U.S. Cl. 23—272.5 10 Claims



A novel process for the dissolution of spent nuclear reactor fuel, while simultaneously controlling the amount of volatile off-gases evolved during the dissolution, comprises the steps of (a) passing spent nuclear reactor fuel, in regulated amounts, through a dissolvent solution, (b) continuously withdrawing the volatile off-gases which are evolved, (c) withdrawing a portion of the solution of spent nuclear reactor fuel when a predetermined maximum concentration of fuel values is reached in the solution, (d) adding a compensating volume of dissolvent solution while step (c) is being carried out, (e) continuously recirculating the remaining portion of the solution of spent nuclear reactor fuel to the dissolution step, (f) discontinuing steps (c) and (d) when a predetermined minimum concentration of fuel values is reached in the solution, and (g) repeating steps (c)–(f) as the predetermined maximum and minimum fuel values are repeatedly obtained in the solution. In a preferred mode of operation two dissolver systems are employed and fuel to be dissolved is fed to one dissolver system while the other dissolver system is being washed, discharged and readied for another dissolution cycle.

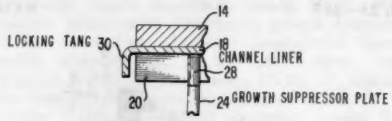
Novel apparatus for carrying out the above-described process comprises one or more dissolving units equipped with means for feeding spent nuclear reactor fuel, in a controlled manner, to a particular member or members of the dissolving units. Each of the dissolving units comprises (a) a fluid-retaining main housing member open at one end and having a fluid inlet means at the opposite end, (b) a fluid-retaining recycle housing member open at one end which open end is connected to the open end of the fluid-retaining main housing member, the opposite end of the fluid-retaining recycle housing member being connected to the opposite end of the fluid-retaining main housing member, (c) means for circulating a dissolvent solution through the fluid-retaining main housing member to the fluid-retaining recycle housing and (d) means for withdrawing a portion of the dissolved fuel solution from the fluid-retaining recycle housing member. A removable perforated basketlike member is inserted in the fluid-retaining main housing member to receive and position the fuel for contact with the dissolvent solution. After dissolution is complete the basketlike member containing the leached hulls may be removed and replaced with an empty basket for another dissolution cycle. In a preferred embodiment, two dissolution units are employed.

3,607,108

SEED HOLDER AND GROWTH SUPPRESSOR ASSEMBLY FOR THE HYDROTHERMAL SYNTHESIS OF QUARTZ

David Wayne Gehres, Carlisle, Pa., assignor to Aiken Industries, Inc., c/o P. R. Hoffman Company, Division of Aiken Industries, Inc., Carlisle, Pa.

Filed Oct. 26, 1967, Ser. No. 678,443
Int. Cl. B01j 17/22
U.S. Cl. 23—273 R 6 Claims



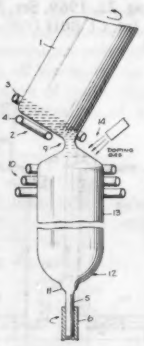
An assembly used for holding quartz seed plates and suppressing growth used in a hydrothermal process of synthetically growing quartz includes a pair of spaced and facing channels for holding flat ends of seed plates and a number of slidable growth suppressor plates held in the channels by tips thereon and extending transverse to the plane of the seed plates. The channels may have removable liners and may be double channels when there are multiple vertical tiers of seeds in an autoclave. A tang on the channel linear prevents the growth suppressor and seed plates from falling out of the channel.

3,607,109

METHOD AND MEANS OF PRODUCING A LARGE DIAMETER SINGLE-CRYSTAL ROD FROM A POLYCRYSTAL BAR

Emil R. Capita, 7020 Kennedy Blvd., North Bergen, N.J.

Filed Jan. 9, 1968, Ser. No. 696,560
Int. Cl. B01j 17/10
U.S. Cl. 23—273 SP 2 Claims



A method and means for producing a large diameter monocrystalline or single-crystal rod of semiconducting material from a polycrystalline bar comprising the supporting of the bar at an angle with the vertical and the heating of the lower end to a molten state by means of a high-frequency induction coil disposed thereabout. The rod may be formed by passing a monocrystalline seed through a space in the induction coil to contact the molten end of the bar forming a fused junction and retracting the seed downwardly while rotating it to draw the molten bar material between the coils out of the heated area to form a recrystallized rod. An additional heating coil may be positioned beneath the angularly disposed bar and heating coil to provide a slow and controlled heat recession during the solidification of the rod and the rod may be gas-doped by introducing the gas into the area of the molten zone.

3,607,110
VACUUM APPARATUS FOR EXCLUDING CARBON IMPURITIES FROM A SILICON BODY

Ernst Haas, Erlangen; Joachim Martin, Erlangen; Konrad Reuschel, Pretzfeld; Norbert Schink, Erlangen, and Carl-Heinz Vogel, Belecke-Mohne, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

Filed Mar. 11, 1968, Ser. No. 712,074
Claims priority, application Germany, Mar. 11, 1967, S 108776
Int. Cl. B01j 17/10
U.S. Cl. 23—273 SP 13 Claims

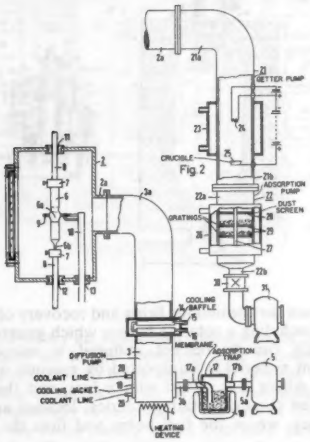


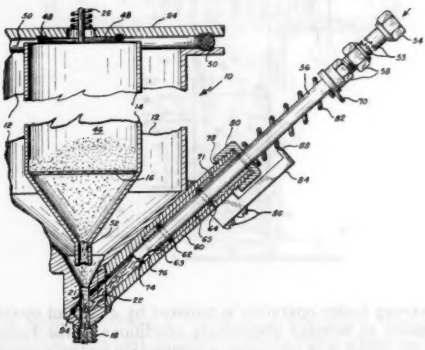
Fig. 2

Apparatus comprising means for capturing carbon-containing vapor emanating from carbon-containing substances in the high vacuum environment and in the equipment for producing the high vacuum in the environment, and adsorbent means for adsorbing the carbon-containing vapor.

3,607,111
VERNEUIL CRYSTALLIZER WITH POWDER BY-PASS MEANS

Joseph A. Adamski, Framingham; Walter B. Jackson, Waltham, and Robert D. Maher, Dorchester, all of Mass.

Filed Mar. 18, 1969, Ser. No. 808,124
Int. Cl. B01j 17/24
U.S. Cl. 23—273 V 3 Claims

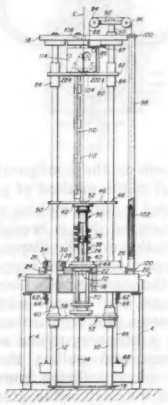


A powder-dispensing assembly for use in combination with a fusion-type crystal-growing furnace in which a carrier gas is used for entraining the powder feed constituents for transportation to the crystal-growing zone thereof. The assembly includes a funnel-shaped powder container positioned an outer container and a means selectively movable for feeding the carrier gas to either the powder container to affect powder fall or to the crystal-growing furnace while simultaneously sealing the powder container to prevent powder fall.

3,607,112
ENDLESS BELT SEED CRYSTAL GRIPPING AND PULLING MEANS

Seymour Mermelstein, Newton, Mass., assignor to Tyco Laboratories, Inc., Waltham, Mass.

Filed Mar. 24, 1969, Ser. No. 809,731
Int. Cl. B01j 17/18
U.S. Cl. 23—273 SP 27 Claims

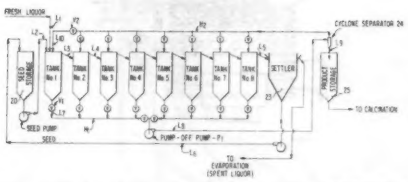


Crystal-growing apparatus comprising a crystal-pulling mechanism in the form of a carriage mounted for vertical movement relative to a melt-containing crucible, a pair of endless belts carried by the carriage and arranged to grip an elongate crystalline body issuing from the melt, and means for moving either the carriage or the endless belts to effect pulling of the crystalline body.

3,607,113
CONTINUOUS PRECIPITATION OF ALUMINA HYDRATE

Richard Henry Featherston, Benton, Ark., assignor to Reynolds Metals Company, Richmond, Va.

Division of Ser. No. 513,518, Dec. 13, 1965, abandoned. Filed Feb. 24, 1969, Ser. No. 816,456
Int. Cl. B01d 9/02
U.S. Cl. 23—273 4 Claims



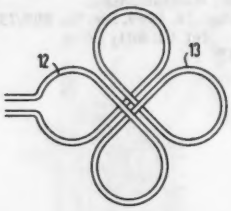
This invention relates to a process for the continuous precipitation of alumina hydrate from aluminate liquors. More particularly, the invention relates to an improved process for continuously precipitating and separating from aluminate liquors, alumina hydrate particles characterized by spherical shape, high density and such coarseness that not less than 85 percent by weight of the product is plus 200 mesh size.

3,607,114

APPARATUS FOR PRODUCING A MONOCRYSTALLINE ROD, PARTICULARLY OF SEMICONDUCTOR MATERIAL

Wolfgang Keller, Pretzfeld, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Division of Ser. No. 713,705, Mar. 18, 1968, Pat. No. 3,498,847.
Filed Oct. 13, 1969, Ser. No. 870,879
Int. Cl. B01j 17/18; H05b 9/02
U.S. Cl. 23—273 SP 2 Claims



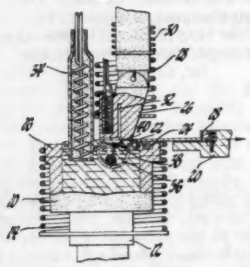
Induction heating coils in the configuration of three-and-four-leaf clovers useful in the method of producing a rod of monocrystalline material includes melting an end of a crystalline supply rod the material that is brought in contact with one end of a substantially vertically disposed crystalline rod-shaped starting body of the material supported at the other end thereof, rotating the starting body about the axis thereof and thickening the one end thereof with material melted from the supply rod into a platform surmounted by a melt of the material, dipping a monocrystalline seed crystal of the material into the melt and pulling therewith a rod of monocrystalline material crystallizing from the melt substantially vertically out of the melt while gradually melting the supply rod further to replenish the melt on the platform.

3,607,115

CRYSTAL PULLING FROM MOLTEN MELTS INCLUDING SOLUTE INTRODUCTION MEANS BELOW THE SEED-MELT INTERFACE

Carl E. Bleil, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 29, 1969, Ser. No. 872,042
Int. Cl. B01j 17/00
U.S. Cl. 23—273 SP 6 Claims



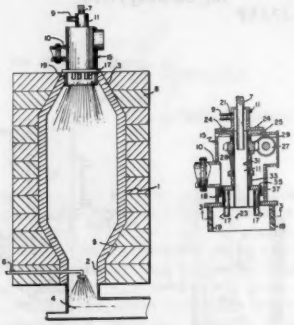
An apparatus and method are disclosed for growing crystals from a melt of a molten solvent metal that is saturated with a solute. Heat is withdrawn through a seed contacting the surface of the melt to precipitate the solute onto said seed at the seed-melt interface. The seed is pulled away from the melt at a rate commensurate with the precipitation rates. Simultaneously, more solute is dissolved into the melt from a solute source in the melt beneath the growth interface while maintaining a close source-growth interface spacing substantially constant.

3,607,116

FURNACE FOR CONTINUOUS FIRING OF PHOSPHORS

Martha J. B. Thomas, Winchester; Ernest A. Dale, Hamilton, and William A. Finch, Marblehead, all of Mass., assignors to Sylvania Electric Products Inc.

Filed Jan. 2, 1970, Ser. No. 258
Int. Cl. F27b 15/10; C09k 1/04; F23m 9/04
U.S. Cl. 23—277 R 4 Claims



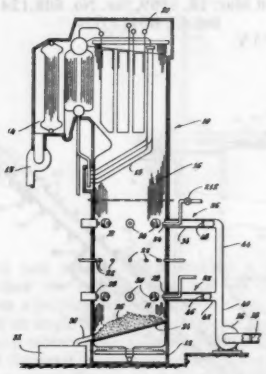
A furnace for continuous firing and recovery of fluorescent material including a rotating burner which generates a flame into which the fluorescent material is introduced. The fluorescent material is transported by gaseous stream into a chamber where it is mixed with a fuel, and the mixture is then forced through rotating nozzles, located at the top of the furnace, where the fuel burns and fires the fluorescent material.

3,607,117

BLACK LIQUOR RECOVERY BOILER COMBUSTION AND SAFETY CONTROL SYSTEM

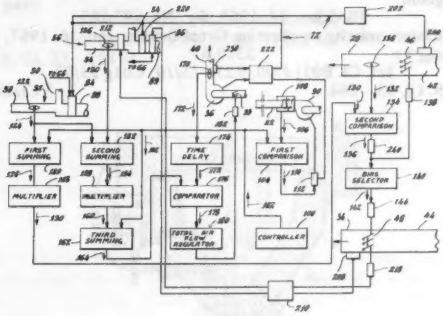
James Marlin Shaw, Gardendale; Roy Roger Herbst, Birmingham, and Fred Endsley Fuller, Birmingham, all of Ala., assignors to Rust Engineering Company, Birmingham, Ala.

Filed July 28, 1969, Ser. No. 845,353
Int. Cl. B01j 6/00; C01b 17/22
U.S. Cl. 23—277 13 Claims



Recovery boiler operation is initiated by a control system responsive to selected preliminary conditions in the boiler. Once the boiler is in operation, a combustion system controls the total amount of air, black liquor, primary fuel and secondary fuel supplied to the recovery boiler to reduce explosion hazards. Actual primary and secondary fuel flow rates are added and a fuel-air demand signal is generated in proportion to the amount of air required to fully combust both fuels. A

black liquor demand signal is added to the fuel-air demand signal to produce a total air demand signal which is compared to the actual rate of flow of combustion air to the boiler. A forced draft controller signal indicative of any difference between the total air demand and the actual airflow is applied to a circuit for controlling a forced draft fan to adjust the total airflow delivered to the boiler, which air is divided into primary air supplied to the reduction zone of the



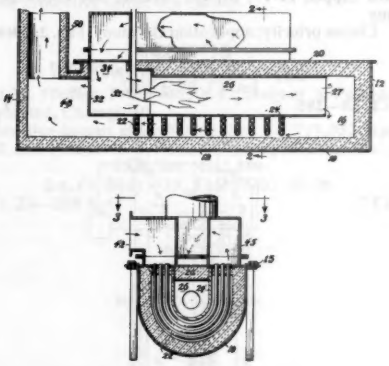
boiler and secondary air supplied to the oxidation zone. The flow of primary air to the reduction zone is automatically controlled in response to black liquor and primary fuel flow rates. The flow of secondary air to the combustion zone is selected automatically in response to the rate of flow of primary air. In the event certain boiler operation safety limits are exceeded, safety circuitry overrides the combustion system to initiate safety procedures which return the boiler operation to normal or shut down the boiler.

3,607,118

FUME INCINERATOR

Philip C. Johnson, Cuba, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed July 3, 1969, Ser. No. 838,859
Int. Cl. F23g 7/06
U.S. Cl. 23—277 C **2 Claims**



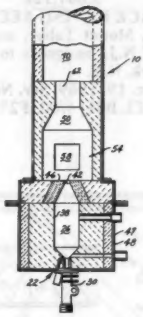
A fume incinerator in which gases containing harmful or obnoxious fumes are preheated before being directed into a combustion chamber. The preheated gases containing air for combustion are then thoroughly mixed with fuel and burned. Upon combustion of the fuel and gas mixture the fumes are subjected to heat therefrom and completely eliminated from the effluent gases.

3,607,119

APPARATUS FOR TREATING GASES

John D. Nesbitt, Toledo, and Klaus H. Hemsath, Sylvania, both of Ohio, assignors to Midland-Ross Corporation, Toledo, Ohio

Filed Sept. 30, 1969, Ser. No. 862,249
Int. Cl. F23g 7/06
U.S. Cl. 23—277 C **9 Claims**



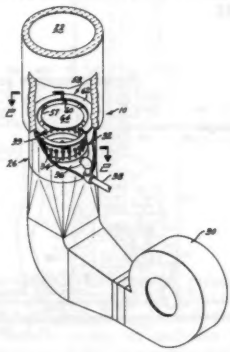
A combustion apparatus for thermally treating gases which are difficult to handle by mechanical compressors or pumps. The apparatus comprises an internal combustion burner capable of producing a high-temperature and high-velocity jet stream of gases which is directed into an adjacent coaxially aligned chamber where it entrains, mixes with and propels a low-velocity stream of gases to be treated which enters the chamber through an opening in the enlarged inlet end of the chamber. The resultant gas stream is propelled through a constricting outlet section of the chamber having a cylindrical throat coaxially aligned with the jet stream. The relative location and size of the throat section are established so that the natural dispersion angle of the jet stream intersects the chamber walls adjacent the inlet end of the throat section or between the inlet and outlet ends of the throat section. A treating chamber is provided adjacent the outlet of the throat section.

3,607,120

GAS-TREATING APPARATUS

John D. Nesbitt, Toledo, and Klaus H. Hemsath, Sylvania, both of Ohio, assignors to Midland-Ross Corporation, Toledo, Ohio

Filed Sept. 29, 1969, Ser. No. 861,714
Int. Cl. F23g 7/06
U.S. Cl. 23—277 C **22 Claims**



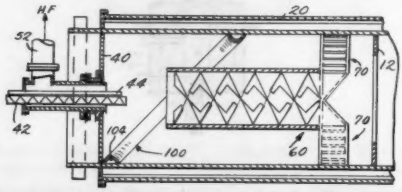
A gas-treating apparatus for causing a nonhomogeneous stream of gases to flow through a casing and to become

homogeneously mixed in a relatively short span of time and space. A baffle extends laterally from the inner surface of the casing partially across the casing so that the outside streamlines of the forward flow do not attach readily to the inner surface of the casing. The inner edge of the baffle defines an opening which has an area and shape that correspond with the cross-sectional area and shape of the casing.

3,607,121
ROTARY FURNACE HAVING RECYCLE PROVISION

William E. Watson, Mount Tabor, and Richard P. Troeger, Chatham, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Dec. 19, 1969, Ser. No. 886,613
Int. Cl. B01j *6/00;* **F27b** *7/16*
U.S. Cl. 23—279 **18 Claims**

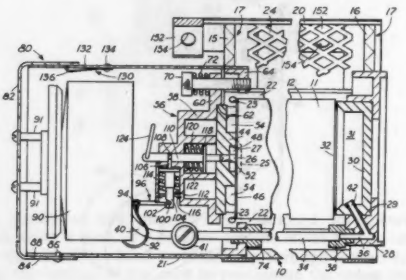


A rotary furnace apparatus, especially useful for carrying out a reaction of fluorspar and sulfuric acid, is provided with a mechanical recycling means within the furnace itself. The recycling means is fixed to an inner shell portion of the furnace so that it rotates with rotational movements applied to the furnace shell by a single driving means. In one embodiment, the recycling means is in the form of a screw conveying device having a cylindrical tube mounted coaxially within the furnace shell, and with two spiral paths defined within the cylindrical tube for receiving and conveying residue material from a downstream area within the furnace shell to an upstream area near the inlet end of the furnace. The screw conveyor is provided with a pair of scoops to pick up residue material and to deposit the material in controlled quantities into the two spiral paths defined in the conveyor. In another embodiment, the recycling means is in the form of an open-ended helical passageway which follows the inner cylindrical wall of the furnace shell from an area of residue pick up to the inlet end of the furnace.

3,607,122
GAS GENERATOR HOUSING

Vladimir Hwoschinsky, Buffalo, N.Y., assignor to A-T-O Inc., Cleveland, Ohio

Filed Jan. 14, 1969, Ser. No. 791,113
Int. Cl. B01j *7/00;* **A62b** *21/00*
U.S. Cl. 23—281 **10 Claims**

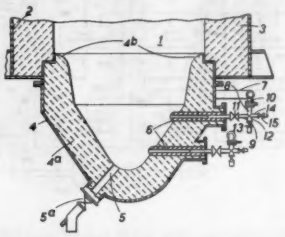


A housing for encasing a gas generator comprising a body formed of a metallic mesh having interconnected crossbars providing heat vent passages therebetween. Bearing support members of high-temperature plastic material are interposed between opposite ends of the generator and the housing. A mounting shield is spaced above the housing to deflect rising heat and direct it outwardly through the vent passages in the housing body.

3,607,123
BASEPLATE ARRANGEMENT

John Edward Russell, Low Worsall, Yarm, and Henry Garth Hudson, Stockton-on-Tees, both of England, assignors to British Titan Products Company Limited, Billingham, England

Filed Jan. 11, 1968, Ser. No. 697,185
Claims priority, application Great Britain, Jan. 16, 1967, 2319/67
Int. Cl. B01j *1/00;* **F27b** *15/10;* **C01g** *23/02*
U.S. Cl. 23—284 **7 Claims**

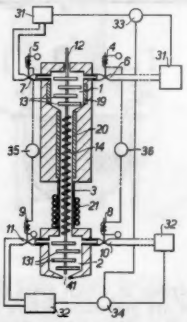


The invention relates to a baseplate for a fluidized bed reactor the baseplate being perforated to hold inlet pipes for admitting gas into the reactor, the inlet pipe being provided with special means to enable loose obstructions to be removed therefrom. Specifically, the inlet pipe may be connected to a gas supply system having a valve located in the axial line of the inlet pipe, the valve being adapted to open to admit a rod therethrough and into the inlet pipe. The inlet pipe may be in the form of an elongated based plug having an outer surface tapered towards the end from which the gas is to issue, the inlet pipe being inserted through a correspondingly tapered perforation in the baseplate. The invention also relates to the use of such a baseplate in a fluidized bed reactor.

3,607,124
MULTISTAGE MIXING DEVICES WITH TIME STAGGERED INPUTS

Richard Zippel, 12-17, Bremer Strasse, 344 Eschwege, Germany

Claims priority, application Germany, Feb. 2, 1968, P 17 29 539.5
Filed Jan. 21, 1969, Ser. No. 792,287
Int. Cl. B01j *4/02*
U.S. Cl. 23—285 **1 Claim**



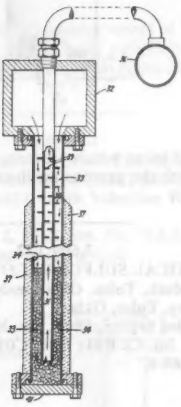
A device for mixing multicomponent plastic materials prepared from fast-reacting prepolymers comprises at least

two mixing chambers with stirring devices, the chambers communicating with each other for material to flow through the chambers in succession, components of the material and, if desired, additives being fed to the chambers through valves, of which those of the second chamber are operable with a delay relatively to those of the first chamber.

3,607,125
REFORMER TUBE CONSTRUCTION

Paul H. Kydd, Scotia, N.Y., assignor to General Electric Company

Filed Dec. 30, 1968, Ser. No. 787,971
Int. Cl. B01j 9/04; F28d 7/12; F28f 1/00
U.S. Cl. 23—288 M **5 Claims**

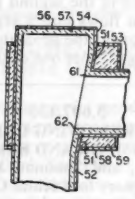


Reformer tube construction is described within which both the desired endothermic catalyzed chemical reaction and heat transfer from the reaction products to the incoming reactants are accomplished. This reformer tube construction eliminates the need for a hot manifold and comprises (in a coaxial tube arrangement) a centrally located product tube and an outer composite wall spaced therefrom with catalyst occupying the annular space therebetween. The composite outer wall combines an inner impermeable metal tube with an outer protective refractory casing.

3,607,126
FLOW-DIRECTING DEVICE

Robert W. Pfeiffer, Bronxville, N.Y., assignor to Pullman Incorporated, Chicago, Ill.

Continuation-in-part of application Ser. No. 719,052, Apr. 5, 1968, now Patent No. 3,492,221. This application Jan. 23, 1970, Ser. No. 5,169
Int. Cl. B01j 9/16; F16l 55/00, 59/16
U.S. Cl. 23—288 E **7 Claims**

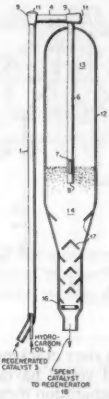


A hollow, truncated cone-shaped device, having an inlet in the smaller diameter area of the cone and one or more outlets in the conical surface.

3,607,127
APPARATUS FOR CONVERSION OF HYDROCARBONS

Robert W. Pfeiffer, Bronxville, N.Y., assignor to Pullman Incorporated, Chicago, Ill.

Continuation-in-part of application Ser. No. 719,052, Apr. 5, 1968, now Patent No. 3,492,221, dated Jan. 27, 1970. This application Jan. 23, 1970, Ser. No. 5,170
Int. Cl. B01j 9/16; F16l 55/00, 59/16
U.S. Cl. 23—288 E **9 Claims**

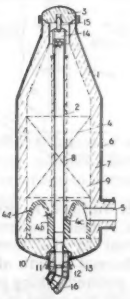


An apparatus for the catalytic conversion of hydrocarbons at short contact times, the apparatus including a transfer line reactor having a vertical riser portion, a crossover portion and a downcomer portion.

3,607,128
AXIAL FLOW REACTION TOWER

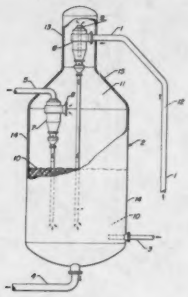
Paul Mevenkamp, Lichtendorf; Hans-Dieter Marsch, Dortmund, and Herbert Biskup, Dortmund-Aplerbeck, all of Germany, assignors to Friedrich Uhde GmbH, Dortmund, Germany

Continuation-in-part of application Ser. No. 677,667, Oct. 24, 1967, now abandoned. This application Apr. 2, 1970, Ser. No. 25,027
Int. Cl. B01j 9/04
U.S. Cl. 23—288 **2 Claims**



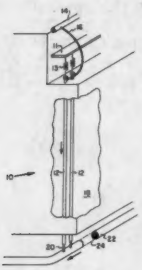
An axial flow delayed combustion furnace or reaction tower for synthesis gas production for pressures greater than 10 atm., and temperatures greater than 700° C., is provided with an inner thermal lining, an arch for supporting the catalyst, the arch being of ring shape and such that a stack is disposed at the center thereof through which the gas-conducting pipe extends. The lower end of the gas pipe is mounted in a reinforced collar on the floor of the reaction tower, and is connected to the tower floor through a sleeve-shaped expansion part.

3,607,129
APPARATUS FOR CATALYTIC CRACKING
Don B. Carson, Mount Prospect, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.
Filed Apr. 13, 1970, Ser. No. 27,784
Int. Cl. B01j 9/20
U.S. Cl. 23—288 S 4 Claims



Apparatus comprising a riser cracking reaction zone and a reaction zone vessel, said vessel having disposed therein a first and second particle separation means, said second particle separation means is connected to said riser reaction zone and said first particle separation means is connected to an outlet stream contained in said reaction zone vessel.

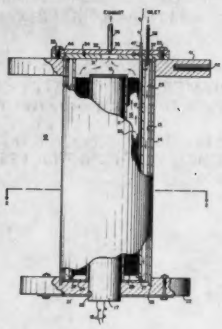
3,607,130
REFORMER FURNACE
Arthur C. Worley, Morristown, and Frank A. Devine, Westfield, both of N.J., assignors to Esso Research and Engineering Company
Filed Sept. 24, 1969, Ser. No. 860,611
Int. Cl. B01j 9/04
U.S. Cl. 23—288 M 9 Claims



A tubular reformer furnace is provided with refractory lined outlet headers, (inlet headers may be lined) said headers being external to the furnace box in order to eliminate excessive thermal growth of the headers, and relatively small diameter unlined tubing is provided for connecting the inlet header with the tubes in order to absorb the differential thermal expansion between the tubes and headers, the small diameter tubing having more than one bend which exceeds 180°.

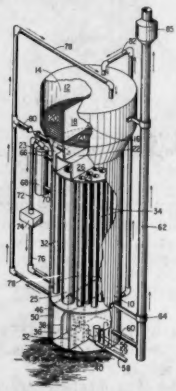
3,607,131
CATALYTIC AIR PURIFIER
Frederick W. Williams, Oxon Hill, Md., and John E. Johnson, Annandale, Va., assignor to the United States of America as represented by the Secretary of the Navy.
Filed Feb. 5, 1969, Ser. No. 796,694
Int. Cl. B01j 9/04
U.S. Cl. 23—288 R 2 Claims

A catalytic air purifier which makes use of a heater positioned along the axis of the device coaxially arranged within surrounding chambers through which the gaseous medium passes. The surrounding chambers are assembled without any



screw-threaded joints which prevents galling due to the heat and contact with the gaseous medium or the surrounding atmosphere.

3,607,132
VERTICAL SULFUR RECOVERY PLANT
Lamar F. Sudduth, Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.
Filed Sept. 5, 1969, Ser. No. 855,473
Int. Cl. B01j 9/04; C01b 17/04
U.S. Cl. 23—288 K 4 Claims

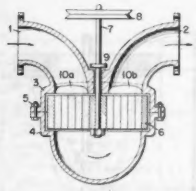


Apparatus for recovery of sulfur from hydrogen sulfide is described in which the catalyst chambers, condensing and boiler sections, and liquid-gas separator compartments are serially arranged. A separate condensing section is provided for each of the catalyst chambers while sulfur produced in the boiler is condensed in the second pass tubes comprising the boiler section, and flows into a separator compartment. Liquid sulfur seals connect the separator compartments, and liquid sulfur is discharged from one of them.

3,607,133
APPARATUS FOR REMOVING CARBON MONOXIDE FROM ROOM AIR AND EXHAUST GAS
Osamu Hirao, Tokyo, and Tsutomu Kato, Hamamatsu-shi, both of Japan, assignors to Kachita Co., Ltd., Hamamatsu-shi, Shizuoka-ken, Japan
Filed Oct. 20, 1969, Ser. No. 867,494
Claims priority, application Japan, Oct. 23, 1968, 43/76805
Int. Cl. B01j 9/06; F01n 3/16
U.S. Cl. 23—288 F 10 Claims

Apparatus for removing carbon monoxide continuously and efficiently from room air or automobile exhaust using an

oxidizing catalyst containing a desiccative substance such as natural zeolite, active silica or active alumina includes a casing having a gas inlet and outlet on its lid section, and a



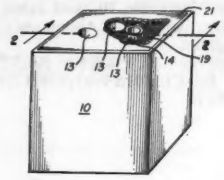
slowly rotatable catalyst containing vessel of flat cylindrical shape closely disposed on the inner periphery of the casing. The air or gas to be purified passes over the catalyst twice, in opposite directions.

3,607,134

SAMPLE HOLDER FOR MAINTAINING BLOOD SAMPLES AT A PRESELECTED TEMPERATURE

Delbert D. McIntyre, 1461 South Valentine Way, Lakewood, Colo.

Filed Oct. 2, 1968, Ser. No. 764,432
Int. Cl. B01l *3/00*
U.S. Cl. 23—292 **9 Claims**



A portable thermal holder for maintaining articles at preselected temperatures is particularly suitable for maintaining blood samples near body temperatures for blood coagulation tests. The holder includes a thermally insulated heat-absorbent body portion having article support means into which articles are placed. In forming the holder a curable material is mixed with a quantity of low heat-conductive granules and poured into a low heat-conductive container. In the container, the lighter granules rise to the top and form a layer of insulation, the curable material hardening to form the heat-absorbent body portion. An external heat source or a self-contained heating unit establishes the desired temperature of the heat-absorbent body portion.

3,607,135

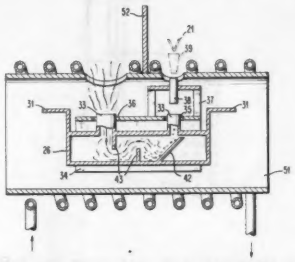
FLASH EVAPORATING GALLIUM ARSENIDE

Reinhard K. Gereth, Heilbronn, Germany; Edward M. Hull, Lagrangeville, and Thomas B. Light, Chappaqua, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 12, 1967, Ser. No. 674,867
Int. Cl. B01d *7/00;* **C01b** *29/00*
U.S. Cl. 23—294 **2 Claims**

A process and apparatus for producing thick films of a material, containing a number of constituents such as compounds, physical mixtures and alloys of material, by flash evaporation is described. Specifically, high feed rates of the material, gallium arsenide, for example, to be flash evaporated are required for depositing uniform, thick films on a substrate and such high feed rates are made possible by preventing clogging of the feed apparatus by the feed materials.

Clogging is prevented by the use of a guide funnel and guide tube arrangement which are disposed one above the other in coaxial vertical alignment with an aperture in a box source heater, the lower extremity of the guide tube is vertically displaced from the aperture a distance sufficient to maintain the temperature of the guide tube below the decomposition or melting temperature of the material but at a tem-



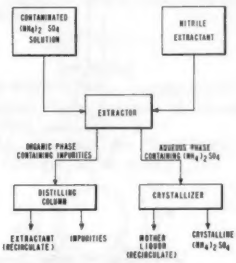
perature in excess of the condensation temperature of the more volatile constituent of the material being evaporated; arsenic in the instance where gallium arsenide is being evaporated.

3,607,136

RECOVERY OF AMMONIUM SULFATE

Robert A. Smiley, Wilmington, Del., and John A. Vernon, Haddonfield, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 15, 1969, Ser. No. 850,435
Int. Cl. B01d *11/04, 9/02;* **C01c** *1/24*
U.S. Cl. 23—299 **5 Claims**



Contacting an aqueous solution of ammonium sulfate contaminated with organic solvent-soluble impurities with a liquid organic nitrile in order to extract impurities from the aqueous solution, and recovering crystalline ammonium sulfate.

3,607,137

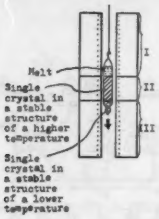
METHOD OF AVOIDING STRAIN IN PHASE TRANSITIONS OF SINGLE CRYSTALS

Toshio Inoguchi; Ichihiko Niwa, and Katsuro Nakazawa, all of Osaka, Japan, assignors to Hayakawa Denki Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 17, 1967, Ser. No. 683,896
Claims priority, application Japan, Nov. 18, 1966, 41/75878
Int. Cl. B01j *17/04;* **C01g** *3/04*
U.S. Cl. 23—296 **7 Claims**

Method for growing crystals of inorganic metal salts from a melt which comprises cooling a single crystal of an inorganic metal salt having at least one solid-solid transition point in a stable structure of a higher temperature in such a manner that the crystal passes through the transition point from an end of the crystal to another end of the same to obtain the corresponding single crystal in a stable structure of a lower

temperature, the transition interface being at such a distance from the solid-liquid interface that the strain caused by the solid-solid transition does not exert any influence on the solid-liquid interface.

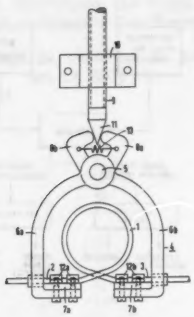

Melt
Single crystal in a stable structure of a higher temperature
Single crystal in a stable structure of a lower temperature
I
II
III

3,607,138

METHOD AND DEVICE FOR CRUCIBLE-FREE FLOATING-ZONE MELTING USING A VARIABLE-DIAMETER HEATING COIL

Wolfgang Keller, Pretzfeld, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Apr. 19, 1968, Ser. No. 722,600
Claims priority, application Germany, Apr. 21, 1967, S 109450
Int. Cl. H05b 9/02; B01j 17/18
U.S. Cl. 23—301 SP **6 Claims**



Method of floating-zone melting includes surrounding a crystalline rod with an annular induction coil of given diameter at an end of the rod having a transition portion tapering outwardly from a seed crystal of considerably smaller thickness than that of the rod, energizing the coil to inductively heat the rod end to molten temperature, and relatively displacing rod and coil along the transition portion and simultaneously gradually increasing the coil diameter. Device for carrying out the foregoing method includes an induction coil of flexible material and a mechanical adjusting device actuable for varying the diameter of the coil.

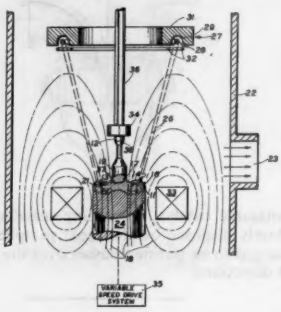
3,607,139

SINGLE CRYSTAL GROWTH AND DIAMETER CONTROL BY MAGNETIC MELT AGITATION

Charles W. Hanks, Orinda, Calif., assignor to Air Reduction Company, Incorporated, New York, N.Y.

Filed May 2, 1968, Ser. No. 726,018
Int. Cl. B01j 17/18
U.S. Cl. 23—301 SP **9 Claims**

A method and apparatus are described for growing a single crystal from a molten pool formed of crystalline material, such as silicon and super alloy metals. Growth of the single crystal is controlled by controlling the thermal pattern, in the molten pool from which the product is grown, through variation in the relative rotation between the molten pool and a magnetic field.

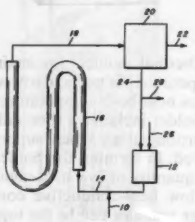


3,607,140

PREPARATION OF ALUMINA OF IMPROVED PURITY BY IRON REMOVAL

Frank E. Miller, Caseyville, Ill., and James L. Martine, Dalkeith, Australia, assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 19, 1968, Ser. No. 777,113
Int. Cl. B01d 9/02; C01f 7/14
U.S. Cl. 23—301 R **15 Claims**



Continuous seeding of a flowing stream of sodium aluminate and with alumina hydrate to precipitate a limited amount of alumina hydrate which carries with it most of any iron and other impurities contained in said stream. The process results in an alumina of improved purity subsequently precipitated from said stream.

3,607,141

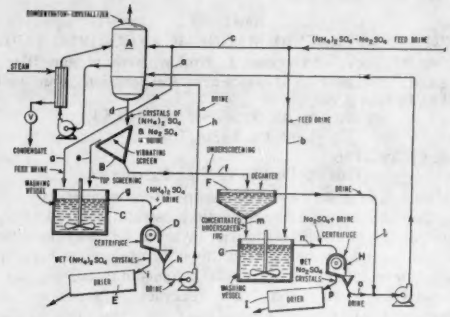
PROCESS FOR THE RECOVERY AND FOR THE SEPARATION OF PURE SODIUM SULFATE AND PURE AMMONIUM SULFATE FROM AQUEOUS SOLUTIONS THEREOF

Antonio Montagna, Mestre, Venezia, and Alberto Scarfi, Siracusa, both of Italy, assignors to Societa' Edison, Milan, Italy

Continuation of application Ser. No. 493,100, Oct. 5, 1965, now abandoned. This application Apr. 29, 1969, Ser. No. 824,729. Claims priority, application Italy, Oct. 6, 1964, 21642/64
Int. Cl. C01c 1/24; C01d 5/00
U.S. Cl. 23—301 **8 Claims**

Finely ground Na_2SO_4 seed crystals are introduced to an aqueous solution which is concentrated at a temperature greater than 60° C. to produce a first fraction consisting of

ammonium sulfate with a minor amount of sodium sulfate, and a second fraction consisting of a predominant amount of sodium sulfate with a minor amount of ammonium sulfate. The respective fractions are then washed to reduce the sulfate in minor amount.



3,607,142

MANUFACTURE OF CRYSTALLINE POTASSIUM PEROXYDIPHOSPHATE

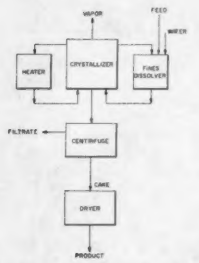
Paul R. Mucenieks, Trenton, N.J., assignor to FMC Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 688,525, Dec. 6, 1967. This application Dec. 4, 1969, Ser. No. 870,479

Int. Cl. B01j *17/04;* **C01b** *15/16*

U.S. Cl. 23—302 **6 Claims**

FLOW DIAGRAM OF THE CRYSTALLIZATION PROCESS



Potassium peroxydiphosphate ($K_4P_2O_8$) is prepared in non-hygroscopic, crystalline form, by evaporating water from the aqueous solution of product, potassium orthophosphate, and potassium fluoride which is obtained in the electrolytic production of the product, while maintaining the solution at a temperature between 50° C. and the solution boiling point, and its pH at between 11.0 and 13.5.

3,607,143

SULFUR EXTRACTION BY SEQUENTIAL CONTACT WITH VAPOR AND WITH LIQUID PERCHLOROETHYLENE

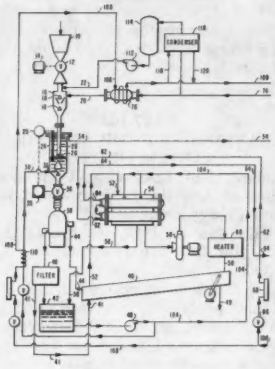
Raymond Wierman, Glendale, and William M. Haire, Manhattan Beach, both of Calif., assignors to Alscoke Limited, Passaic, N.J.

Filed June 24, 1968, Ser. No. 739,230

Int. Cl. B01d *11/02;* **C01d** *17/08*

U.S. Cl. 23—312 S **6 Claims**

This patent describes a process for the recovery and purification of sulfur which comprises contacting a sulfur-bearing ore with hot perchloroethylene vapor, permitting at least some of said vapor to condense on said ore particles, contact said ore with liquid perchloroethylene in an extraction zone whereby a substantial portion of the elemental sulfur in said ore is extracted into said perchloroethylene phase, and thereafter recovering said elemental sulfur from said perchloroethylene phase. Preferably the perchloroethylene used in the practice of the process is combined with a perchloroethylene stabilizer which retards the decomposition of the perchloroethylene.



3,607,144

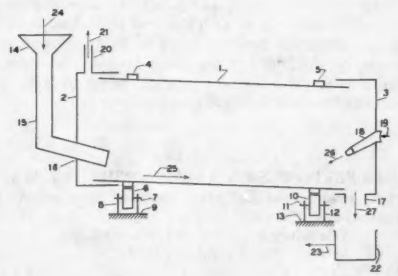
PROCESS OF NODULIZING PHOSPHATE ROCK

Roy E. Paul, Columbia, Tenn., assignor to Stauffer Chemical Company, New York, N.Y.

Filed Apr. 29, 1968, Ser. No. 724,817

Int. Cl. C05b *19/00;* **C01b** *25/00*

U.S. Cl. 23—313 **5 Claims**



An improved process for manufacturing phosphate nodules from phosphate rock which consists of charging the aggregate phosphate rock into a rotating kiln. The phosphate rock is then heated by a flame that impinges upon the nodules formed at the exit end of the kiln. The improvement consists of using a higher temperature flame at the point of impingement of the flame upon the nodules. This is preferably brought about by adding pure oxygen to the combustionable air mixture.

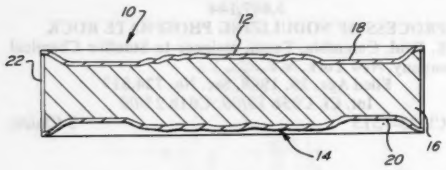
3,607,145
PLUTONIUM SEPARATION FROM URANIUM
Donald A. Wenz, Downers Grove, Ill., assignor to the United States of America as represented by the United States Atomic Energy Commission
Filed Jan. 6, 1969, Ser. No. 789,359
Int. Cl. C01g *56/00, 57/00;* **C22b** *61/04*
U.S. Cl. 23—325 **6 Claims**

Plutonium dioxide is more soluble in molten magnesium chloride than is uranium dioxide. Separation of plutonium from a mixture of plutonium dioxide and uranium oxides is accomplished by dissolving the plutonium dioxide from the mixture with magnesium chloride and separating the undissolved uranium oxides.

3,607,146
PREPARATION OF CHEMICALLY REACTIVE URANIUM TRIOXIDE
Roger K. Ballard, Salt Lake City, Utah, assignor to the United States of America as represented by the United States Atomic Energy Commission
Filed Jan. 19, 1970, Ser. No. 4,022
Int. Cl. C01g *43/00, 43/02*
U.S. Cl. 23—347 **6 Claims**

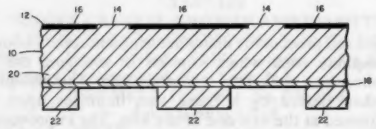
The chemical reactivity of uranium trioxide produced by the fluidized bed process is increased by adding a small amount of aluminum nitrate and a slight excess of nitric acid to the aqueous uranyl solution prior to denitration in a fluidized bed at a temperature of at least 400° C.

3,607,147
BIMETALLIC COIN
Brian G. Harrison, Drexel Hill, Pa., assignor to The Franklin Mint, Inc., Yeadon, Pa.
Filed Sept. 17, 1969, Ser. No. 858,689
Int. Cl. A44c *21/00*
U.S. Cl. 29—191 **3 Claims**



A coin is disclosed having a middle layer of aluminum clad on its opposite major faces with stainless steel. The aluminum layer has a thickness corresponding to 80 to 95 percent of the combined thickness of the three layers. The color differential between the layers is minimal since all layers have substantially the same light reflective properties.

3,607,148
SOLDER PREFORMS ON A SEMICONDUCTOR WAFER
Robert S. Foote, Phoenix, Ariz., assignor to Motorola Inc., Franklin Park, Ill.
Filed July 23, 1969, Ser. No. 844,120
Int. Cl. B32b *15/04*
U.S. Cl. 29—195 **5 Claims**

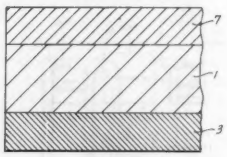


A semiconductor wafer having a plurality of gold solder preforms attached to one surface thereof. The gold solder preforms are attached to an area of the wafer which is in registration with and wholly within the area defined by the scribe lines areas located on the opposite surface.

3,607,149
HIGH-TEMPERATURE MAGNETIC RECORDING TAPE
James M. Rice, and Irving J. Hutkin, both of San Diego, Calif., assignors to Dynasciences Corporation, Blue Bell, Pa., by said Rice
Filed Nov. 10, 1965, Ser. No. 513,637
Int. Cl. B32b *15/00*
U.S. Cl. 29—196 **4 Claims**
This application filed under rule 47

This patent describes a high-temperature magnetic recording tape comprising a nonmagnetic substrate, adhered to said substrate an intermediate barrier layer for resisting the diffusion of foreign elements from the substrate, and adhered to said intermediate barrier layer a magnetic coating layer adapted to receive and retain recorded information, said magnetic coating layer being at least 10μ inches thicker than the total thickness of all other layers on said substrate.

3,607,150
GOLD-FILLED METAL FOR JEWELRY MANUFACTURE
Thomas E. McGinn, deceased, late of Rehoboth, Mass., by Robert P. Beekman, c/o Metals & Controls Inc., 34 Forest St., Attleboro, Mass. (Assistant Treasurer of Metals and Controls, Inc.)
Filed Dec. 30, 1968, Ser. No. 812,941
Int. Cl. B32b *15/00*
U.S. Cl. 29—199 **6 Claims**
This application filed under rule 47

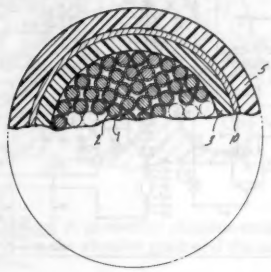


A nickel alloy base layer, consisting substantially of copper 65 percent, nickel in the range of 10 to 18 percent and the balance zinc, has a thin, substantially pure nickel backing bonded on one side. On the other side is carried a layer of gold of suitable karat, with or without the interposition of another thinner layer of substantially pure nickel bonded between the base and to the gold to form an interliner. The interliner is used when the nickel alloy consists of nickel substantially in the range of 10 to 14 percent. The interliner is omitted when the nickel alloy consists of nickel substantially in the range of 15 to 18 percent. Bonding is performed in the solid phase by rolling.

3,607,151
COMPOSITE CABLE SHEATHING HAVING AN ALUMINUM-SILICON LAYER
Michael J. Pryor, Woodbridge, and William H. Anthony, Guilford, both of Conn., assignors to Olin Mathieson Chemical Corporation
Continuation-in-part of application Ser. No. 677,955, Oct. 25, 1967. This application Sept. 11, 1968, Ser. No. 759,117
Int. Cl. B32b *15/00*
U.S. Cl. 29—196.2 **15 Claims**

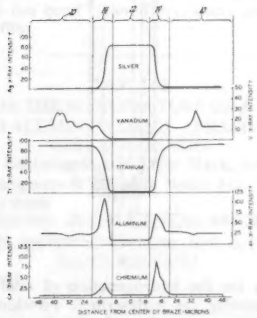
This invention relates to a high strength aluminum alloy containing Zn, B, Mg and Si metallurgically bonded to a thin

layer of an aluminum alloy containing at least 0.050% Si,



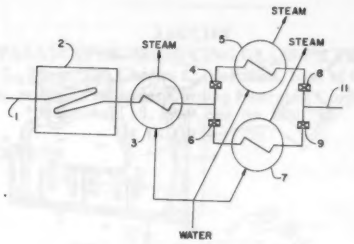
which thin layer is also bonded to steel for use in both aerial and underground cable sheathing.

3,607,152
SILVER BRAZED TITANIUM COMPOSITE
Dean K. Hanink, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.
Division of Ser. No. 550,994, May 18, 1966, Pat. No. 3,466,737.
Filed Mar. 10, 1969, Ser. No. 805,536
Int. Cl. B32b *15/00*
U.S. Cl. 29—198 **3 Claims**



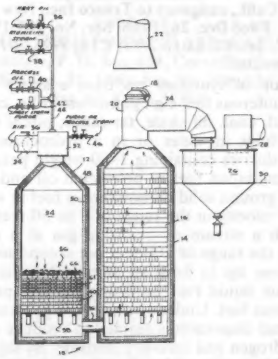
A method is disclosed for the silver brazing of titanium workpieces to avoid the formation of the brittle silver-titanium intermetallic compound. In a preferred embodiment a thin film of chromium is vapor deposited on titanium surfaces to be brazed. Silver brazing is then accomplished by conventional methods, the chromium layer permitting the interdiffusion of silver and titanium but preventing the formation of a brittle intermetallic compound. The brazed product has a ductile alloy bond between the titanium sections comprising titanium, chromium and silver.

3,607,153
QUENCH ARRANGEMENT
Hartoch J. Cijfer, The Hague, Netherlands, assignor to Selas Corporation of America
Filed Jan. 23, 1969, Ser. No. 793,523
Claims priority, application Netherlands, Sept. 20, 1968, 6813467
Int. Cl. C10g *9/04*; F28f *27/02*
U.S. Cl. 48—102 R **6 Claims**



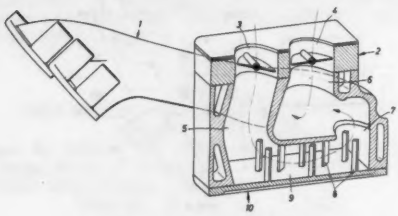
Quench arrangement for use in the cracking of hydrocarbons, which arrangement includes a precooler followed by a pair of aftercoolers connected in parallel.

3,607,154
REFRACTORY BED FOR GAS MACHINE AND PROCESS FOR PRODUCING OIL GAS
Donald L. White, Bethesda; Ernest B. Donaldson, Suitland, Md., and Arthur J. Middleton, Cleveland, Ohio, assignors to Washington Gas Light Company, Washington, D.C.
Filed Nov. 6, 1969, Ser. No. 874,471
Int. Cl. C10g *11/28*
U.S. Cl. 48—102 R **6 Claims**



An apparatus and process for producing a combustible oil gas as a supplement to heating gas from a gas generator comprising a bed of curved elongated refractory bodies composed of silicon carbide material having a high thermal conductivity superimposed upon a layer of refractory grid tile capable of withstanding over 3,000° F., the bed being of a thickness of 0.05–0.5 times the diameter of the shell of the gas generator containing the refractory bed, each body having a curved surface with a diameter between 0.5 to 0.08 times the bed thickness and a length approximately 0.2 to 1.0 times the bed thickness, the bed being directly exposed to form the bottom of a combustion chamber within the gas machine so as to absorb thermal shock and to preserve the conventional refractory brick tile from fusing and spalling and restricting the flow of gas through the refractory bed as well as to maintain a rapid heating oil ignition to avoid explosions within the refractory bed.

3,607,155
SUCTION PIPE FOR AN INTERNAL COMBUSTION ENGINE WITH A SPRAY CARBURETOR
Georg Faltermeier, Wolnzach, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Danube, Germany
Filed Nov. 20, 1969, Ser. No. 878,399
Claims priority, application Germany, Dec. 10, 1968, P 18 14 129.2
Int. Cl. B01f 3/02; F02m 17/00
U.S. Cl. 48—180 R 5 Claims



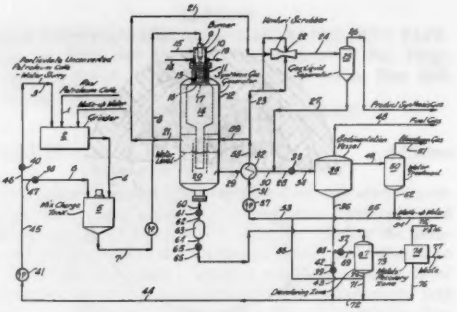
A suction pipe for an internal combustion engine with a spray carburetor having two parallel mixing chambers each of which has a conduit for the mixture. The suction pipe is particularly characterized by a channel joining the mixing chamber of the first stage and extending below a widened conduit connected to the second stage. The channel is provided with inserts which produce eddies and its projection upon an imaginary horizontal plane is perpendicular to the projection of the widened portions of the conduit.

3,607,156
HYDROGEN AND CARBON MONOXIDE FROM SLURRIES OF SOLID CARBONIFEROUS FUELS
Warren G. Schlinger, Pasadena; William L. Slater, La Habra; Roger M. Dille, La Habra, and Joseph P. Tassoney, Whittier, all of Calif., assignors to Texaco Inc., New York, N.Y.
Filed Dec. 26, 1968, Ser. No. 787,191
Int. Cl. C01b 2/14; C10j 3/06, 3/16
U.S. Cl. 48—206 7 Claims

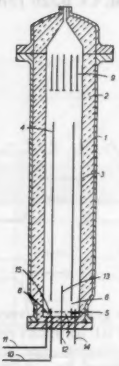
Production of synthesis gas from a slurry of particulate solid carboniferous fuel e.g., petroleum coke, coke from bituminous coal, coal, oil shale, tar sands, pitch, or mixtures of said solid fuels in water or in a hydrocarbon liquid fuel. Pumpable slurries containing 1–60 weight percent of ground solid carboniferous fuel in petroleum oil and 25–55 weight percent of ground solid carboniferous fuel in water at a relatively low velocity in the range of 5 to 50 feet per second is mixed with a stream of oxidizing gas at a relatively high velocity in the range of 200 feet per second to sonic velocity at the burner tip to form an atomized dispersion of water, hydrocarbon liquid fuel, oxidizing gas and particulate solid carboniferous fuel. Under synthesis gas generating conditions the atomized dispersion is reacted to produce a gaseous mixture of hydrogen and carbon monoxide. By this process, slurry feeds of low cost solid carboniferous fuels may be gasified without being preheated.

3,607,157
SYNTHESIS GAS FROM PETROLEUM COKE
Warren G. Schlinger, Pasadena; William L. Slater, La Habra; Roger M. Dille, La Habra, and Joseph P. Tassoney, Whittier, all of Calif., assignors to Texaco Inc., New York, N.Y.
Continuation-in-part of application Ser. No. 787,191, Dec. 26, 1968. This application July 23, 1969, Ser. No. 844,112
Int. Cl. C01b 2/14; C10j 3/16; C22b 59/00
U.S. Cl. 48—206 9 Claims

Production of synthesis gas (mixtures of hydrogen and carbon monoxide) in a refractory lined reaction zone of a partial oxidation free-flow synthesis gas generator by feeding to said reaction zone a stream of particulate petroleum coke containing heavy metal constituents dispersed in H_2O. Attack of said refractory lining by the metals and metal compounds present in said petroleum coke, or their reaction products, is substantially prevented by controlling the feedstreams to the reaction so that entrained in the product gas leaving the reaction zone is an amount of unconverted petroleum coke containing unreacted about 8 weight percent or more of the quantity of carbon originally present in the petroleum coke feedstream.



3,607,158
PROCESS FOR THE HYDROGENATION OF COAL
Frederick James Dent; Brian Hoyle Thompson, and Henry Lawrence Conway, all of Solihull, England, assignors to The Gas Council, London, England
Filed Mar. 12, 1969, Ser. No. 806,552
Int. Cl. C10j 3/00
U.S. Cl. 48—210 9 Claims

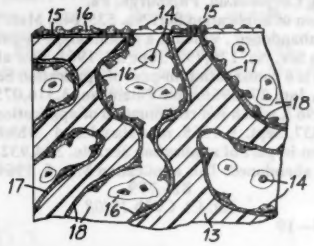


A process for the hydrogenation of coal to produce a methane-containing gas is described. Powdered raw coal is introduced into a recycling fluidized bed of noncaking material. The coal is rapidly heated and at least partly hydrogenated, and converted into a noncaking powdered char. The process is generally operated at temperatures of 600° to 1,000° C. and pressures of 10 to 200 atmospheres.

3,607,159
A SATURATED, RESILIENT, FLEXIBLE AND POROUS ABRASIVE LAMINATED
George L. Haywood, Latham, N.Y., assignor to Norton Company, Troy, N.Y.
Filed May 12, 1967, Ser. No. 638,042
Int. Cl. B24b 1/00; C08g 51/12
U.S. Cl. 51—295 5 Claims

A resilient, controlled density, porous structure is laminated to a flexible backing and contains fine abrasive particles adhesively bonded to the surface opposite such

backing and distributed within said resilient structure with the abrasive density ranging inversely to the distance from



the flexible backing. A protective abrasion-resistant layer is interposed between the abrasive grain and the surfaces of the resilient structure.

3,607,160

LIGROIN CONTAINING PUMICING COMPOSITION

Katsuo Makino, and Iwao Sawato, both of Kanagawa-ken, Japan, assignors to Xerox Corporation, Rochester, N.Y.

Division of Ser. No. 540,177, Jan. 13, 1970, Pat. No. 3,488,896.
Filed Oct. 2, 1968, Ser. No. 788,974
Int. Cl. B24b *1/00*
U.S. Cl. 51—304 **1 Claim**

A pumicing composition consisting essentially of cerium oxide and zinc stearate particles dispersed in ligroin, a fourth fraction petroleum distillation product.

3,607,161

QUICK-DRYING SCOURING COMPOSITION

John Alexander Monick, Teaneck, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 3, 1968, Ser. No. 718,342
Int. Cl. B24d *3/02*
U.S. Cl. 51—307 **5 Claims**

A scouring composition comprising a cationic surface active compound and a water-soluble abrasive which leaves a surface which has been cleaned dry, shiny and free from a gritty residue film.

3,607,162

PROCESS FOR THE MANUFACTURE OF A ZIRCONIUM OXIDE AND ALUMINUM OXIDE ABRASIVE OF HIGH GRIT TOUGHNESS

Gerd Edzard Bockstiegel, and Peter Hack, both of Ranzel, Germany, assignors to Dynamit Nobel AG, Troisdorf Bez. Cologne, Germany

Filed Nov. 28, 1967, Ser. No. 686,280
Claims priority, application Germany, Dec. 2, 1966, D 51688
Int. Cl. B24d *3/02*
U.S. Cl. 51—309 **4 Claims**

Substantially pore-free abrasive grit comprising zirconium oxide mixed with alumina or bauxite made by mixing the components together in molten form in the substantial absence of nitrogen.

3,607,163

METHOD FOR MAKING GLASS TUBES

Howard Cameron Smith, and William Bell Allan, both of Glasgow, Scotland, assignors to Barr and Stroud Limited, Anniesland, Glasgow, Scotland

Filed June 12, 1968, Ser. No. 740,428
Claims priority, application Great Britain, July 14, 1967, 32411/67
Int. Cl. C03b *19/04, 37/02*
U.S. Cl. 65—1 **4 Claims**

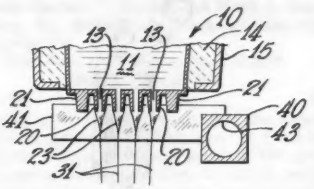
This invention relates to a method of producing a tube from a glass that gives off undesirable vapors when heated in which glass cullet is placed into a horizontally disposed forming tube that is made of a material which is not wetted by the glass and has a lower coefficient of expansion (for instance the forming tube may be made of a borosilicate glass). The cullet is heated to melt the cullet while the forming tube rotates so that it coats the tube. The forming tube is cooled until the glass from the cullet has solidified as a tube. This tube may be used for making fibers in which a rod is subsequently inserted into this tube.

3,607,164

APPARATUS FOR PRODUCING GLASS FILAMENTS

Craig L. Thom, and Charles L. McKinnis, both of Granville, Ohio, assignors to Owens-Corning Fiberglass Corporation

Filed Aug. 18, 1969, Ser. No. 850,792
Int. Cl. C03b *37/00*
U.S. Cl. 65—1 **8 Claims**



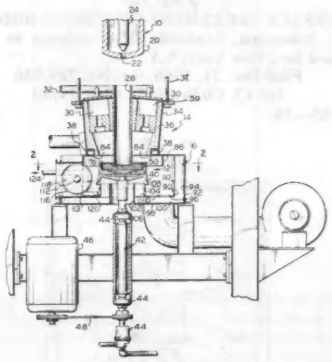
An apparatus for producing glass filaments has an array of orificed tips through which streams of molten glass are flowed and then attenuated into filaments. A uniform filament-forming environment is attained by employment of solid heat-radiating tips to thermally shield certain active array boundary tips from the influences of a cooler ambient atmosphere.

3,607,165

GLASS FIBER FORMING APPARATUS

Bernard M. Guthrie, P. O. Box 434, Corvallis, Oreg.

Filed Jan. 31, 1969, Ser. No. 806,334
Int. Cl. C03b *37/04*
U.S. Cl. 65—14 **13 Claims**



A glass fiber forming apparatus comprises a cup-shaped spinner rotated about a vertical axis. Glass is fed to the spinner near the center and evenly distributed by spinning action. Spinner rim is serrated to divide glass into separate streams. Spinner is surrounded by heating means and glass fibers are blown downwardly into pneumatic conveyor for collection and removal.

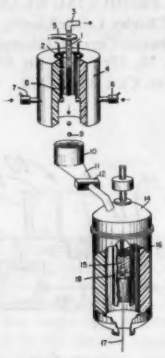
3,607,166
MANUFACTURE OF STRIATION-FREE QUARTZ TUBING

Frederick A. Loughridge, Manchester, and Richard J. Ziebell, Ipswich, both of Mass., assignors to Sylvania Electric Products Inc.

Continuation of application Ser. No. 726,889, May 6, 1968, now abandoned. This application June 26, 1968, Ser. No. 749,554

Int. Cl. C03b *23/20, 19/06, 3/00*

U.S. Cl. 65—18 9 Claims



Striation-free, refractory-type glass tubing can be manufactured by placing particulate, crystalline, refractory materials in a tube of refractory glass having a sealed end. The tube is evacuated to withdraw gases and the vacuum is maintained. The sealed end of the tube is heated to its softening point and the particulate materials contained therein will melt, thereby converting these materials into a vitreous condition. Softened pieces are then broken off and substantially gas-free bodies of vitreous, refractory glasses having substantially no reentrant portions are formed. The majority of the surfaces are smooth and rounded. These bodies are then fed into a melter of conventional design at atmospheric pressure and substantially striation-free, refractory-type tubing is drawn.

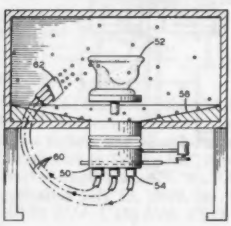
3,607,167
SURFACE TREATMENT OF POROUS BODIES

John M. Robertson, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.

Filed Dec. 31, 1968, Ser. No. 789,036

Int. Cl. C03b *23/20;* C03c *19/00*

U.S. Cl. 65—18 10 Claims



A method of densifying the surface of porous bodies which comprises impacting the surface of the porous bodies with a plurality of spheres sufficient to cause compressive forces in the surface during subsequent firing and vitrification of the porous body.

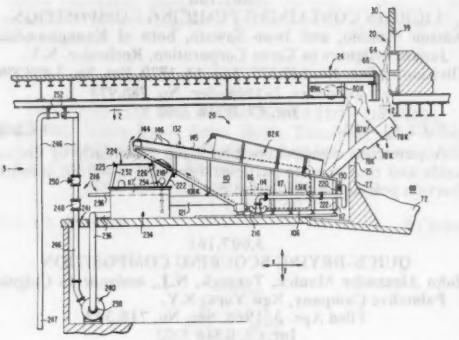
3,607,168
STEEL SLAG HANDLING SYSTEM AND METHOD FOR USING SAME

John J. Grady, New Florence, Pa., assignor to International Steel Slag Corporation, Pittsburgh, Pa.

Continuation of application Ser. No. 535,143, Mar. 17, 1966, now abandoned , which is a continuation-in-part of application Ser. No. 126,792, June 28, 1961, now abandoned , which is a continuation-in-part of application Ser. No. 428,519, Jan. 27, 1965, now Patent No. 3,316,075, dated Apr. 25, 1967, which is a continuation of application Ser. No. 485,037, Sept. 3, 1965, now abandoned , which is a continuation-in-part of application Ser. No. 304,932, Aug. 27, 1963, now abandoned. This application May 6, 1969, Ser. No. 826,779

Int. Cl. C03b *19/08*

U.S. Cl. 65—19 26 Claims



There is disclosed herein apparatus and method for handling molten steel slag produced in a steelmaking furnace by cooling and granulating the slag on a continuous basis through interception of a stream of molten slag with a jet stream of water having particularly specified characteristics of shape, velocity and flow, and transportation of the granulated slag to a remote location as a slag/water slurry.

3,607,169
METHOD FOR PRODUCING EVACUATED GLASS MICROSPHERES

Edwin F. Coxe, Marietta, Ga., assignor to Esso Research and Engineering Company

Filed Nov. 7, 1968, Ser. No. 774,181

Int. Cl. C03b *19/08, 19/10*

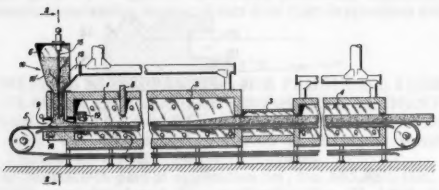
U.S. Cl. 65—21 3 Claims

A method is provided for the production of low density, internally coated, evacuated microspheres wherein the sphere density is uniform and the sphere diameter and wall thickness can be controlled accurately. In a preferred embodiment of the instant method, molten glass (or other suitable nonmetallic material) is used to encapsulate zinc or another suitable metal in either the solid or liquid state. After the metal has been encapsulated the temperature of the particle is increased until the encapsulated metal vaporizes and blows the particles into thin-walled, hollow spheres which are then quenched so that the encapsulating walls become rigid before the condensing metal vapor on the inside of the walls causes the spheres to collapse.

3,607,170
METHOD AND APPARATUS FOR CONTINUOUSLY MANUFACTURING FOAM GLASS

Jaromir Malesak, Prague, Czechoslovakia, assignor to Statni Vyzkummy ustav sklarske techniky, Prague, Czechoslovakia

Filed May 8, 1968, Ser. No. 727,458
Claims priority, application Czechoslovakia, May 20, 1967, PV 3678-67
Int. Cl. C03b *19/08*
U.S. Cl. 65—22 6 Claims

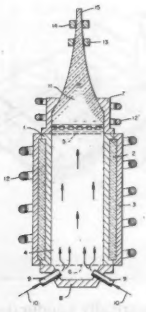


A method and apparatus for manufacturing foam glass from a mixture of glass powder and a foaming agent. The mixture is initially preheated in a nonoxidizing atmosphere while being advanced in a given direction through a preheating zone of a tunnel kiln. The nonoxidizing atmosphere in the preheating zone of the tunnel kiln is withdrawn from the latter in countercurrent to the direction of movement of the mixture therethrough, and nonoxidizing burning takes place through burners capable of carrying out nonoxidizing burning in the immediate vicinity of the region where the mixture of glass powder and foaming agent is initially delivered to a conveyor band which conveys the mixture through the preheating zone to be received thereafter in a foaming zone. The kiln preferably includes a partition means situated between the preheating and foaming zones and at the inlet of the kiln there is a discharge outlet through which the atmosphere of the preheating zone is withdrawn. A supply means extends downwardly through the discharge outlet to supply the mixture to the conveyor band.

3,607,171
METHOD FOR HEATING MELTING OR SOFTENING GLASS IN DISPERSED FORM

Peter Hirsch, Oberland, Germany, assignor to VVB Technisches Glas, Ilmenau, Langewiesener, Germany

Filed Nov. 29, 1968, Ser. No. 780,148
Int. Cl. C03b *19/08*
U.S. Cl. 65—22 4 Claims



A method of continuously heating, melting or softening a material, comprising in a preferred embodiment disposing in an upright elongated heating zone a fusible substance, heating the substance to maintain the substance in a hot fused condition, introducing into the fused substance near an end of the zone the material being treated, the material and the fused substance being so selected that they are immiscible and are of different specific gravities, the introduction being near the lower end of the zone when fused substance is of higher specific gravity than the material being treated and the introduction being near the upper end of the zone when the fused substance is of lower specific gravity than the material being treated, whereby the material being treated migrates to the end of the zone opposite from the end near which it is introduced and accumulates as a body above or below, depending upon the direction of migration, the fused substance, the material in the course of the migration being heated by the fused substance to the desired heated, softened or molten state.

3,607,172
TRIPOTASSIUM PHOSPHATE TREATMENT FOR STRENGTHENING GLASS

James P. Poole; Herbert C. Snyder, and Mark A. Boschini, all of Brockway, Pa., assignors to Brockway Glass Company, Inc., Brockway, Pa.

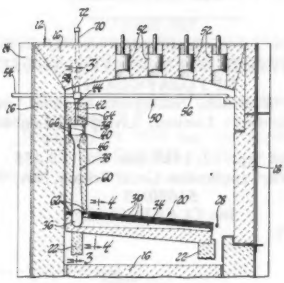
Filed Nov. 1, 1968, Ser. No. 772,835
Int. Cl. C03c *21/00*
U.S. Cl. 65—30 6 Claims

Strengthening glass articles by spraying the same with a water solution of tripotassium phosphate (K_3PO_4) at a temperature slightly below the strain point of the glass, then holding the glass at such temperature for a time period sufficient to provide exchange of potassium ions for sodium ions of the glass surface, the potassium ions being of larger atomic diameter than the sodium ions whereby a surface compressive stress is created.

3,607,173
METHOD AND APPARATUS FOR HEAT TREATING SHEETS OF GLASS

Robert G. McMaster, Torrance, Calif., and Stanley W. Joehlin, Curtice, Ohio, assignors to Permaglass, Inc., Millbury, Ohio

Filed Mar. 14, 1969, Ser. No. 807,328
Int. Cl. C03b *25/04*, *29/04*
U.S. Cl. 65—25 A 27 Claims



A method and apparatus for treating sheets of glass. The apparatus illustrated for carrying out the invention includes an elongated furnace with an elongated support bed disposed in the furnace and having gas inlets to emit gases against the sheet to effect a heat transfer between the sheet and the gases and gas outlets for gases to pass through after contacting the sheet. A plurality of inspirators are spaced along the bed and each inspirator has an opening to draw ambient gases within the furnace thereinto and an exit for directing the gases to the inlets in the bed. A source of pressurized gases is connected through various conduits to the inspirators. The conduits supplying the pressurized gases are disposed in coils in the furnace for heating the pressurized gases prior to the injection thereof into the inspirators.

3,607,174

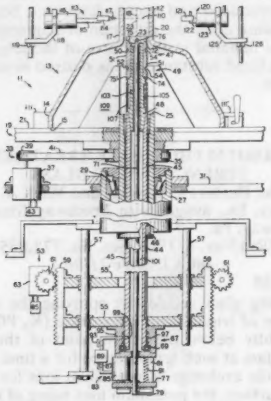
METHOD AND APPARATUS FOR APPLYING A GLASS COLLET TO A CATHODE-RAY TUBE

Gordon S. Patrick, Leipsic, Ohio, assignor to Sylvania Electric Products Inc.

Continuation of application Ser. No. 691,365, Dec. 18, 1967, now abandoned. This application Mar. 9, 1970, Ser. No. 17,819

Int. Cl. C03c *27/00*

U.S. Cl. 65—28 4 Claims



A method and apparatus for attaching a neck collet to the neck stub of a cathode-ray tube funnel utilizing a single axial reference in a manner that the axis of the collet coincides with the axis of the funnel perpendicular to the sealing edge. The sealing edge of the open funnel is positioned on a rotatable funnel support means which has a hollow axial spindle shaft oriented perpendicular to the support means and affixed thereto. Slidably oriented within the spindle shaft is a center shaft formed to extend through the funnel and protrude beyond the neck stub thereof. Collet holding means, associated with the terminal portion of the center shaft, insures positive concentric alignment of the collet with the neck stub since the axes are coincident.

3,607,175

CONTROL SYSTEM FOR MODIFYING THE SURFACE OF FLOAT GLASS

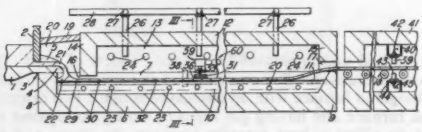
Albert Sidney Robinson, Southport, England, assignor to Pilkington Brothers Limited, Liverpool, Lancashire, England

Filed Sept. 12, 1968, Ser. No. 759,455

Claims priority, application Great Britain, Nov. 9, 1967, 51050/67

Int. Cl. C03b *18/02*

U.S. Cl. 65—29 13 Claims



Desired characteristics are imparted to float glass by maintaining a body of molten material in contact with the upper surface of the floating glass ribbon to migrate ions from the molten material into the surface of the glass, photoelectrically, sensing any change in the rate of modification of the glass surface, and employing an indication of that change to restore a desired rate of modification.

3,607,176

METHOD OF SEALING METAL IN A VITREOUS ENCLOSURE

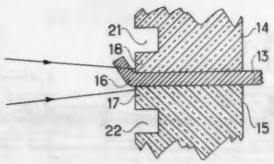
Alexandre Milochevitch, Saint Michel sur Orge, and Maurice Roulot, Orsay, both of France, assignors to Compagnie Generale D'Electricite, Paris, France

Filed Aug. 22, 1968, Ser. No. 754,553

Claims priority, application France, Sept. 1, 1967, Sept. 18, 1967, 119,720;121,387

Int. Cl. C03c *27/02*

U.S. Cl. 65—32 9 Claims



A method of sealing a metallic wire between two vitreous parts. The wire is positioned so that its ends extend outwardly from opposite sides of the enclosure formed by the parts. The adjacent side edges of the parts are formed with protuberent lips which surround the portion of the wire adjacent one end thereof. The parts are preheated, in a controlled atmosphere. A laser beam is then focused on the one end of the wire to fuse it and thereby also fuse, by contact heat transfer, the side portions of the vitreous parts which are adjacent the wire. The wire is thus welded in the enclosure with the fused protuberent lips forming an outwardly extending enclosure portion which reinforces the seal in the area adjacent to the fused wire.

3,607,177

PROCESS AND APPARATUS FOR SURFACE MODIFICATION OF GLASS

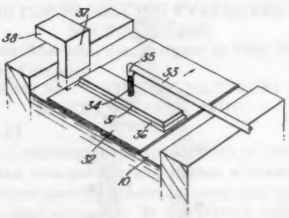
Albert Sidney Robinson, Birkdale, Southport; David Gordon Loukes, Eccleston Park, Prescot, and Jack Lawrenson, Windle, St. Helens, all of England, assignors to Pilkington Brothers Limited, Liverpool, Lancashire, England

Filed May 29, 1968, Ser. No. 733,109

Claims priority, application Great Britain, June 19, 1967, 28273/68

Int. Cl. C03c *21/00*

U.S. Cl. 65—30 17 Claims



A body of molten electrically conductive material is maintained against hot glass by causing the molten body to cling to a locating member adjacent the glass, and electric current is passed between the molten body and the glass to cause controlled migration of an element from the molten body into the glass surface.

3,607,178

TREATING GLASS SHEETS USED IN LAMINATED SAFETY GLASS WINDSHIELDS

Brook J. Dennison, Pittsburgh, and Albert A. Doutt, Tarentum, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 19, 1968, Ser. No. 760,982
Int. Cl. C03c *21/00*
U.S. Cl. 65—30 **9 Claims**

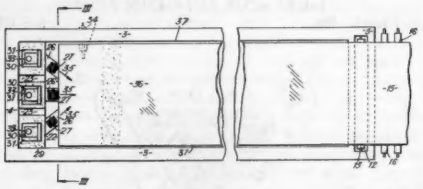
Rinsing glass sheets prior to their lamination in water having a hardness in a controlled range, preferably between about 200 and about 400 parts by weight of calcium and/or magnesium expressed in terms of calcium carbonate per million parts by weight of water and preferably containing a mixture containing more calcium ions than magnesium ions.

3,607,179

METHOD AND APPARATUS FOR PRODUCING FLOAT GLASS BY OXIDIZING GLASS-FORMING ELEMENTS

David Gordon Loukes, Prescot, and Alan Edward Hay, Ormskirk, both of England, assignors to Pilkington Brothers Limited, Liverpool, Lancashire, England

Continuation-in-part of application Ser. No. 585,889, Oct. 11, 1966, now abandoned. This application Mar. 21, 1969, Ser. No. 809,119
Int. Cl. C03b *18/00*
U.S. Cl. 65—32 **22 Claims**



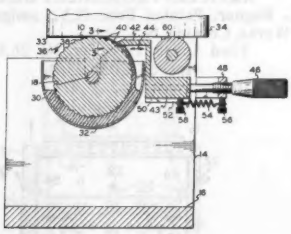
Glass-forming elements are fed into a body of molten metal which is maintained under controlled oxidizing and thermal conditions to produce glass-forming oxides therein in relative proportions to synthesize a particular glass which collects as a layer on the surface of the molten metal and is removed as a layer from the metal surface.

3,607,180

BONDING WITH A GLASS FRIT COATING APPLIED BY A KNURLED ROLLER

Joseph P. Merz, Portland; Yeng P. Wong, Beaverton, and Wayne A. Fetters, Canby, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed June 25, 1968, Ser. No. 739,808
Int. Cl. C03c *23/00, 27/00*
U.S. Cl. 65—33 **10 Claims**



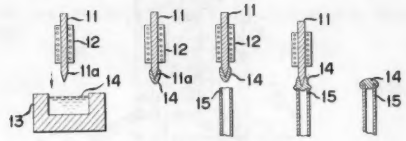
A coating apparatus and method are described in which a knurled applicator roller is employed to apply a slurry of suspended particles to the surfaces of articles of different shape. The applicator roller is motor driven and partially immersed in the slurry solution so that it agitates such slurry as it is rotated to prevent settling of the particles. The articles are fed onto the applicator roller from an idler roller. An adjustable scraper blade is supported adjacent the applicator roller to control the thickness of the slurry layer provided on such roller. The present apparatus and method is employed to apply a coating of a slurry of glass frit particles suspended in a solution of organic binder and solvent, to the end of the funnel portion of a cathode-ray tube envelope in order to enable such glass frit to form a seal between such funnel portion and the faceplate of such envelope.

3,607,181

GLASS BRAZING METHOD

Eizo Goto, Chigasaki-shi, Japan, assignor to Tokyo Shibaura Electria Co., Ltd., Kawasaki-shi, Japan

Filed Dec. 24, 1968, Ser. No. 786,656
Claims priority, application Japan, Dec. 25, 1967, Jan. 10, 1968, Feb. 19, 1968, 42/82695, 43/1020, 43/10074
Int. Cl. C03c *27/00*
U.S. Cl. 65—40 **5 Claims**



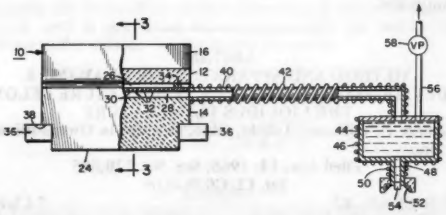
A glass brazing method for sealing a seal portion of a workpiece wherein the brazing glass is applied to the tip of a soldering iron by the step of dipping the tip of the iron heated to a first temperature, into a bath of molten glass so that some of the glass adheres to the tip. The tip is then positioned above the seal portion and is heated to a temperature higher than the first temperature so that the glass on the tip melts and pours down onto the seal portion to close it. In another embodiment the brazing glass adhering to the tip is brought into contact with the seal portion and an electric current is conducted through the brazing glass across the seal portion and the tip to thus melt the glass to pour it down onto the seal portion.

3,607,182

METHOD AND APPARATUS FOR REMOVAL OF BUBBLES FROM SHEET GLASS OVERFLOW FORMING SURFACES

Howard A. Leibowitz, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 29, 1970, Ser. No. 58,900
Int. Cl. C03b *17/00*
U.S. Cl. 65—53 **10 Claims**



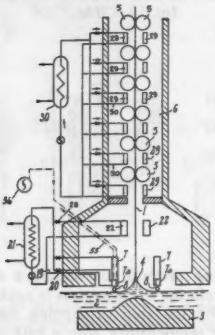
A heated evacuation system is applied to the junction between upper and lower blocks forming a two-part overflow sheet-drawing apparatus, to remove seed and bubbles which may be trapped at outer edge portions of such junction where they tend to cause streaks or other optical distortions in the sheet glass produced by such apparatus. A vacuum is applied to a heated accumulator which is connected to a slot

formed at the junction between the upper and lower blocks by a heated conduit, to withdraw molten glass containing seed or bubbles into such slot and through the heated conduit into the accumulator where it is maintained in a molten condition for either continuous or periodic removal therefrom.

3,607,183
METHOD AND APPARATUS FOR DRAWING SHEET GLASS

Jean Francois Flori, Chalon-sur-Saone, France, assignor to Compagnie de Saint-Gobain, Neuilly sur Seine, France

Filed Apr. 6, 1966, Ser. No. 540,696
Claims priority, application France, Apr. 12, 1965, 12,829
Int. Cl. C03b *15/02*
U.S. Cl. 65—83 **15 Claims**



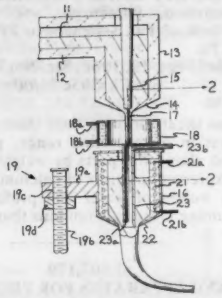
Method and apparatus for drawing sheet glass, wherein the temperature of the incipient sheet from the line of draw to the drawing rollers is controlled at and along the width of the sheet to effect uniformity of thickness of the sheet throughout its width. Control is effected by establishment of a plurality of series of individual compartments in contiguous side-by-side relation and extending along lines which are generally parallel with the sheet and extend transversely of its length direction, closely adjacent the line of draw. Each series of compartments is allochirally positioned on a respective side of the sheet or line of draw; and each compartment is individually supplied with coolant at an individually controlled rate. By such individual control of the rate of flow of coolant it is assured that the temperature of each section of the sheet, consisting of an increment of length thereof, extending transversely from one side edge of the sheet to the other, is uniform and the temperature differences between one such increment and the next adjacent one are maintained at proper predetermined values. Control of rate of circulation of coolant through the several compartments may be automatic.

3,607,184
METHOD AND APPARATUS FOR DRAWING A DEVITRIFIABLE GLASS AT A TEMPERATURE BELOW THE LIQUIDUS TEMPERATURE

George F. Williams, Toledo, Ohio, assignor to Owens-Illinois, Inc.

Filed Apr. 12, 1968, Ser. No. 720,855
Int. Cl. C03b *9/38*
U.S. Cl. 65—83 **7 Claims**

This application discloses method and apparatus for producing, without appreciable surface devitrification, glass tubing from a glass composition which has a liquidus temperature close to the temperature at which the glass is at its preferred working viscosity. According to the invention, glass is delivered in a thin stream from a feeder of a glass-melting furnace to a relatively small receiving vessel and is rapidly and evenly cooled to a temperature below the liquidus temperature en route. The glass is maintained in the receiving vessel in a body without reheating above the liquidus temperature and a glass product of predetermined shape is

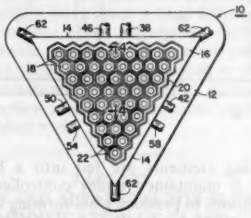


downwardly drawn from the body of glass in an otherwise conventional fashion.

3,607,185
METHOD FOR FORMING MULTIBORE TUBING

Carl D. Andrysiak, Painted Post, and Richmond W. Wilson, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 7, 1968, Ser. No. 765,494
Int. Cl. C03b *15/14*; **C03c** *23/20*
U.S. Cl. 65—86 **5 Claims**

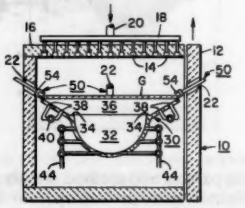


Thin-walled multibore tubing have from about 10 to over 300 individual longitudinal bores is unitarily formed by drawing molten glass downwardly through a multiple bell orifice structure so as to provide a multiplicity of small diameter holes or bores having thin-walled partitions therebetween which produce an open frontal area of up to about 80 percent of the cross-sectional area of such tubing with a hole density of over 200 holes per square inch.

3,607,186
METHOD AND APPARATUS FOR FORMING HOLLOW ARTICLES FROM SHEET GLASS

Lewis L. Bognar, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 8, 1970, Ser. No. 26,523
Int. Cl. C03b *23/02*
U.S. Cl. 65—104 **9 Claims**



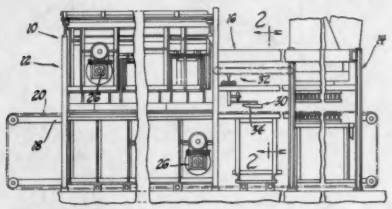
Sheet glass positioned upon a preheated forming mold is rapidly heated to approximately its softening point whereu-

pon, as the sheet begins to sag, it is controllably fed into the forming cavity of the mold by the simultaneous application of vacuum to such cavity and pressure to a feeding surface surrounding such cavity, so as to form a hollow article of substantially the same uniform thickness as the glass sheet.

3,607,187
METHOD AND APPARATUS FOR RESHAPING GLASS SHEETS

Harold A. McMaster, Woodville, Ohio, assignor to Permaglass, Inc., Millbury, Ohio

Filed Jan. 8, 1969, Ser. No. 789,795
Int. Cl. C03b *23/02*
U.S. Cl. 65—106 **25 Claims**

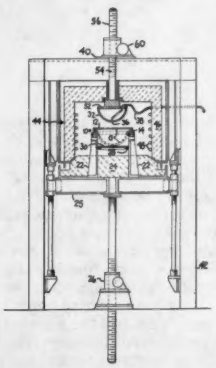


A method and apparatus for curving a sheet of glass wherein a substantially flat sheet of glass is conveyed through a heating means and removed from the conveyor by a mold means having a curved surface with a vacuum supplied thereto for pulling the sheet thereagainst to curve the sheet. The mold means is then moved through the apparatus to move the sheet to a cooler medium where it is replaced on conveyor means. There is also included a cooling means. In one embodiment the conveying means comprises an endless loop conveyor extending through the heating means and through the cooling means, and the mold means moves into the cooling means and replaces the curved sheet onto the conveyor in the cooling means. In a second embodiment the conveying means includes an endless loop conveyor in the heating means only and an endless frame or ring is disposed exteriorly of a cooling means so that the mold means lifts the sheet of glass from the loop conveyor with the vacuum and then moves to place the curved sheet of glass on the frame which in turn moves into the cooling means for cooling the sheet of glass.

3,607,188
METHOD AND APPARATUS FOR BENDING GLASS SHEETS

George W. Stilley, Freeport, and Herbert W. Eilenfeld, Brackenridge, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 6, 1969, Ser. No. 847,883
Int. Cl. C03b *23/02*
U.S. Cl. 65—106 **10 Claims**



Apparatus and method for shaping glass into spherical shapes by extrusion using a ring support, a plunger movable from above to below said ring support and means other than a mold shaping surface for receiving the shaped glass disposed below the ring support.

3,607,189
MELTING PARTICULATE GLASS BATCH

William Manring, Hamilton, Ohio, assignor to FMC Corporation, New York, N.Y.

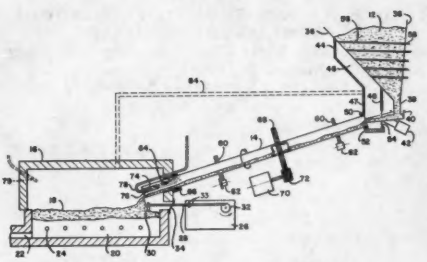
Filed Dec. 23, 1968, Ser. No. 786,353
Int. Cl. C03b *5/16*
U.S. Cl. 65—134 **5 Claims**

An improved process for producing glass designed for television tubes is described comprising adding either barium carbonate or strontium carbonate to a glass batch in the form of hard, prefused particles made by fusing a mixture of said barium carbonate (or strontium carbonate) with at least 20 percent by weight of sodium carbonate and/or potassium carbonate.

3,607,190
METHOD AND APPARATUS FOR PREHEATING GLASS BATCH

Harvey Larry Penberthy, 5624 S. W. Admiral Way, Seattle, Wash.

Filed Sept. 14, 1967, Ser. No. 667,773
Int. Cl. C03b *5/16*
U.S. Cl. 65—134 **13 Claims**



A rotary inclined preheated kiln receives batch from a hopper and preheats the batch within a temperature range, preferably between about 1200° F. to 1500° F. by a gas burner located at the discharge end of the kiln. Effluent gas from the furnace may also be fed into the kiln for preheating purposes and the combustion and/or effluent gases may then be discharged into pipes disposed in the supply hopper in heat exchange relation with the batch therein. The gases exiting from the kiln are maintained above the dew point. Another form provides a second hopper supplying refining agents to the preheated batch prior to charging in the furnace. A third form adds sulfate and amber glass to the batch whereby the iron sulfide in the amber glass is sealed in a glass matrix and is preserved for reaction with the sulfate to release sulfur dioxide for the refining process.

ERRATUM

For Class 65—136 see:
Patent No. 3,606,825

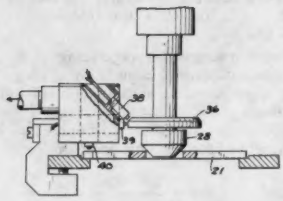
3,607,191
GLASS-FORMING MACHINE WITH POSITION SENSING MEANS

Richard A. Birner, and Arthur C. Einfalt, both of Toledo, Ohio, assignors to Owens-Illinois, Inc.

Filed June 15, 1970, Ser. No. 46,432
Int. Cl. C03b *21/04*
U.S. Cl. 65—158 **7 Claims**

A glass-forming machine comprising a first articulated conveyor that has a plurality of orifice plates onto which a ribbon of glass is delivered and a second articulated conveyor

having a plurality of plungers moving along in synchronism with the orifice plates and movable radially toward and away from the glass ribbon on the orifice plate. Means are provided along a portion of the path of each of the conveyors for



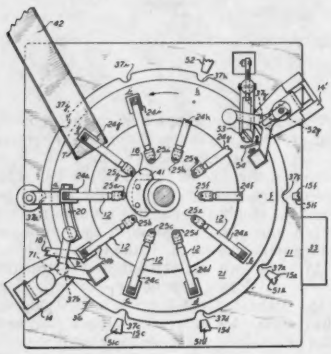
sensing the positions of the orifice plates and the plungers as they pass a sensing station. The resultant sensing pulses are analyzed to determine the relative synchronization of the orifice plates and plungers.

3,607,192

MULTIPLE STATION AUTOMATED CONTROL DEVICE FOR GLASS THERMOMETERS

Charles Eisler, Jr., Short Hills, N.J., assignor to Eisler Engineerig Co., Newark, N.J.

Filed Oct. 22, 1968, Ser. No. 769,552
Int. Cl. C03b *23/10*
U.S. Cl. 65—158 **7 Claims**



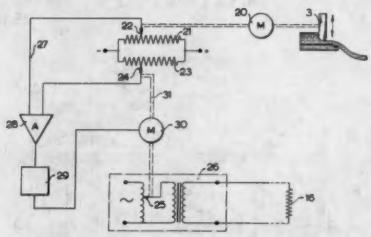
The disclosed invention is directed to an automatic, multiple-station turntable apparatus for automatic control of blister collapse in the production of thermometers. The turntable comprises a plurality of holders members for gripping the thermometer, equipment to move the turntable, a first projection and viewing station positioned beyond a loading station, and a heating station positioned beyond the first projection and viewing station to apply heat for collapsing the blister in the thermometer. A second projection and viewing station which includes a manual heat application means which is located beyond the first-mentioned heating station. An annealing station and a dispensing station are located on the last part of the turntable.

3,607,193

FLOAT GLASS APPARATUS WITH HEAT EXCHANGE CONTROL

Robert Bourggraff, Cologne, and Franz Classen, Porz-Grengel, both of Germany, assignors to Erste Deutsche Floatglas GmbH & Co., Cologne, Germany

Filed May 16, 1968, Ser. No. 729,635
Claims priority, application Germany, May 16, 1967, E 33991
Int. Cl. C03b *18/02*
U.S. Cl. 65—160 **3 Claims**



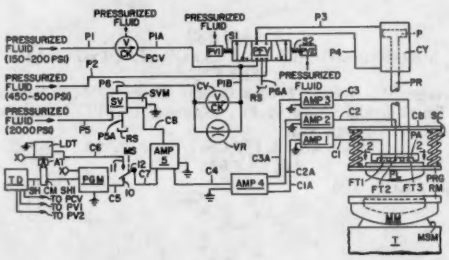
The specification describes a float glass production plant in which, in order to prevent breakages, variations in the rate of feed of molten glass onto a metal bath are arranged to bring about variations in heating of the glass near the position at which it leaves the bath.

3,607,194

PRESSURE CONTROL SYSTEM FOR GLASSWARE PRESS MOLDING

Daniel R. Ayers, Shelburne, Vt., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 20, 1970, Ser. No. 29,188
Int. Cl. C03b *11/16*
U.S. Cl. 65—160 **6 Claims**



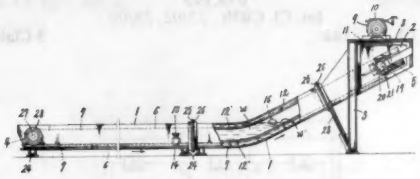
A system for controlling the pressing forces exerted by complemental mold members against a charge of molten thermoplastic material during a press forming stage of a cycle of press forming of the charge into an article having desired dimensions and shape. Means are employed for providing a first varying signal or sequence of signals representative of a program for said pressing forces, a second varying signal or sequence of signals representative of the actual pressing forces exerted during said press forming stage, and comparing said signals to produce third signals representative of any differences in the first and second signals or sequences thereof. The third signals control the pressing forces by selective adjustment of pressurized fluid supplied for actuation of at least one of the mold members toward the other during the press forming stage of the cycle of press forming the charge of molten material.

3,607,195

APPARATUS FOR FRACTURING HOT GOBS OF GLASS

Yasuo Horio, Yao-shi, Japan, assignor to Yamabishi Industry Co., Ltd., Yao-shi, Osaka, Japan

Filed May 19, 1969, Ser. No. 825,914
Claims priority, application Japan, May 25, 1968, 43/35653
Int. Cl. C03b *37/00*
U.S. Cl. 65—165 4 Claims



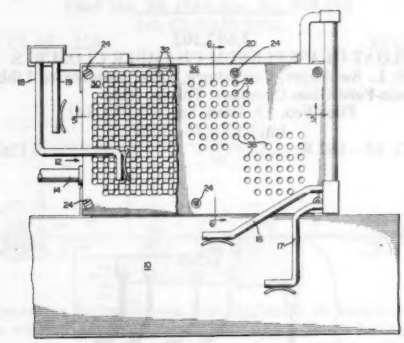
Apparatus for fracturing hot glass lumps or gobs by dropping them from the heating furnace supply into cold water being circulated in a conveyor through where the sudden temperature change fractures the lumps or cracks them ready for fracturing into small pieces; and improved bath and conveyor apparatus in which the initially unsuitable molten gobs or lumps of glass are fractured and collected for reprocessing for ultimate productive use.

3,607,196

DEAD PLATE ASSEMBLY FOR FRESHLY FORMED GLASSWARE

Francis J. Garvey, Newfield, N.J., assignor to Garvey Products Corporation, Blue Anchor and Hammonton, N.J.

Filed Mar. 25, 1968, Ser. No. 715,819
Int. Cl. C03b *27/00*
U.S. Cl. 65—167 9 Claims



A dead plate is provided in three mutually superposed layers: (1) a strong flat bottom layer fully perforated all over and permanently covering the air box, (2) a similarly perforated readily removable top layer formed with spaced depressions and elevated points for making minimal contact with the hot newly molded glassware, and (3) an intervening flat plate interchangeably selected from a series each of which is provided with perforations in a limited area of special pattern for conforming desirably closely to a particular size and shape of ware intended to traverse the dead plate.

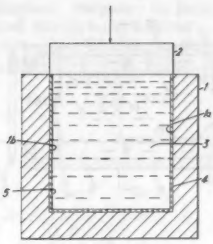
3,607,197

MANUFACTURE OF FIBER OPTIC STACKS

John M. Ballantine, Glasgow, Scotland, assignor to Barr & Stroud Limited

Filed Nov. 6, 1968, Ser. No. 773,883
Claims priority, application Great Britain, Nov. 10, 1967, 51168/67
Int. Cl. C03c *23/20*, *39/00*; C03b *39/00*
U.S. Cl. 65—169 6 Claims

A process for manufacturing fiber optic stacks from an array of fibers subjected to heat and pressure in a fusion vessel, the array being separated from the vessel by a metal foil. The fusion vessel may be of graphite. A high-temperature



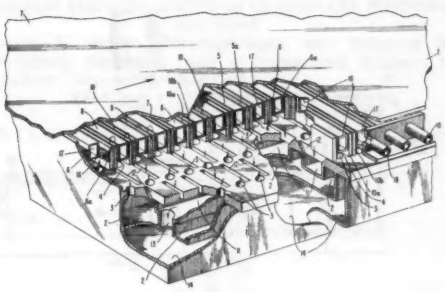
lubricant, preferably boron nitride, may be used between the foil and the vessel.

3,607,198

APPARATUS FOR PNEUMATICALLY SUPPORTING FLEXIBLE RIBBONS AND SHEETS OUT OF CONTACT WITH SOLIDS

George Meunier, Saint-Maur; Hubert Michaud, Paris, and Roland Souchet, Asnieres, all of France, assignors to Compagnie de Saint-Gobain, Neuilly-sur-Seine, France

Filed Mar. 4, 1968, Ser. No. 710,016
Claims priority, application France, Mar. 31, 1967, 101,018
Int. Cl. C03b *25/04*
U.S. Cl. 65—182 A 23 Claims



Moving hot glass sheet and similar ribbons of material are supported pneumatically out of contact with solid surfaces by establishing alternate zones of static and kinetic gas pressure along the passage of sheet. Each zone extends substantially across the full width of the sheet. Apparatus for controlling the temperature and pressure of the zones so as to perfect the sheet are described.

3,607,199

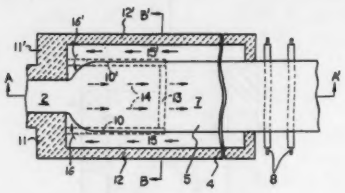
FLOAT GLASS APPARATUS WITH FLOW CONTROL DAMS

Kiyoshi Itakura, Nishinomiya-shi, and Seizo, Noguchi, Amagasaki-shi, both of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Sept. 20, 1968, Ser. No. 761,030
Claims priority, application Japan, Sept. 29, 1967, 42/62729
Int. Cl. C03b *18/02*
U.S. Cl. 65—182 R 6 Claims

In a float process for the manufacture of float glass on a molten metal bath, physical dam barriers are disposed longitudinally and laterally in the bath in a U-shape form in plan view, so as to form predetermined and separated backflow currents at laterally opposite sides of the glass ribbon being formed, which backflow currents flow from the downstream and progressively cooled end of the molten bath back toward the hottest or upstream end thereof flowing around or through the longitudinal barrier ends, as spaced from the up-

stream end walls of the bath tank, to reenter and rejoin the bath flow beneath the glass ribbon at the upstream or glass-



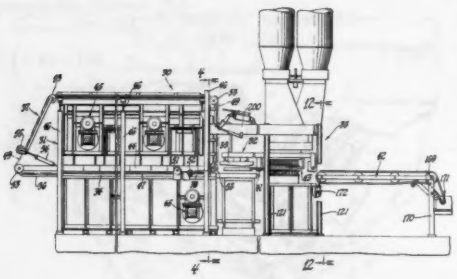
entering end to thereby become gradually and sufficiently reheated, thereby together serving to remove a potential cause for effecting irregularities in the flatness of the glass.

3,607,200

APPARATUS FOR CONVEYING GLASS SHEETS THROUGH ADJACENT BENDING AND TEMPERING STATIONS

Harold A. McMaster, Woodville, Ohio, assignor to Permaglass, Inc., Millbury, Ohio

Filed Dec. 18, 1967, Ser. No. 691,326
Int. Cl. C03b *23/02, 27/00*
U.S. Cl. 65—182 A **59 Claims**



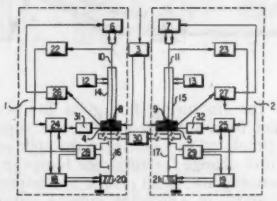
An apparatus for curving a sheet of glass including a furnace having an elongated gas support bed for supporting sheets of glass thereover, conveying means for moving a sheet from the first end to the second end of the bed, a bending station disposed adjacent the second end of the bed and including a sheet supporting surface for supporting a sheet of glass on gases thereover, a shuttle means for moving a sheet of glass from the second end of the bed to the gas supporting surface in the bending station, a blasthead adjacent the bending station for impinging fluid against opposite sides of the sheet for cooling thereof, oscillating means in the blasthead for oscillating a sheet therein, and unitary frame means for lifting a sheet from the gas supporting surface in the bending station for bending the sheet and for thereafter moving the sheet into the blasthead while at the same time removing a sheet from the oscillating means in the blasthead to remove the sheet from the blasthead. The independently novel features of the conveying assembly are the shuttle means and its specific structure for moving a sheet of glass from the furnace to the bending station, the single unitary frame means for supporting a sheet in the bending station and moving it into the blasthead while simultaneously removing a sheet from the blasthead, the unique support of the forming surface means in the bending station against which a sheet is pressed for curving thereof, and an oscillating means in the blasthead for removing a sheet from the frame means and oscillating the sheet in the blasthead while it is being cooled.

3,607,201

INSTALLATION FOR CASTING A MICROWIRE IN GLASS INSULATION

Vitaly Ippolitovich Zaborovsky, ul. Kalinina, 2/16; Oleg Alexeevich Ivanov, Demokraticheskaya ul. 10/3, kv. 53, and Anatoly Nikolaevich Savenkov, ul. Dimo, 17/1, kv. 46, all of Kishinev, U.S.S.R.

Continuation of application Ser. No. 547,308, May 3, 1966, now abandoned. This application Nov. 28, 1969, Ser. No. 876,193
Int. Cl. C03b *25/02, 29/00*
U.S. Cl. 65—162 **3 Claims**



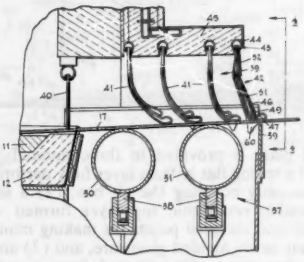
An installation is provided for casting microwire in glass insulation, in which the charge metal and glass supplied into the microbath are melted with by means of a high-frequency generator inductor and the resultant microwire is wound on a receiving bobbin. The installation also comprises a device for controlling the linear resistance of the microwire adapted for use as a transmitter for correcting the operating conditions of microwire casting, such as the microwire reception speed and the microbath temperature.

3,607,202

FLOAT GLASS PLENUM CHAMBER CLOSURES

Francis L. Swillinger, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Glass Company, Toledo, Ohio

Filed Feb. 27, 1968, Ser. No. 708,542
Int. Cl. C03b *18/00*
U.S. Cl. 65—182 R **6 Claims**

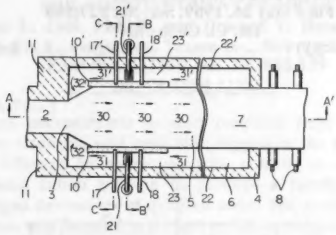


This application discloses a plenum chamber for enclosing the atmosphere above the float bath in a float glass forming apparatus, with a closure drape at its exit end that is made up of a doubled or looped sheet of asbestos supported from its free ends to hang with its loop end adjacent the glass ribbon moving over the float bath, a metal rod hung inside and acting to maintain the looped sheet in a generally vertical plane, and a looped sheet of a different refractory material hung adjacent and similar to the asbestos sheet but enough longer to permit its loop end to lie on the moving ribbon of glass and to be carried thereby beneath the metal rod.

3,607,203
FLOAT GLASS APPARATUS WITH LONGITUDINAL DAMS AND METAL FLOW CONTROL MEANS

Yukiya Fujimoto, and Masanari Matsushita, both of Kyoto-fu, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed July 1, 1968, Ser. No. 741,361
Claims priority, application Japan, July 7, 1967, 42/43712
Int. Cl. C03b *18/02*
U.S. Cl. 65—182 R 10 Claims

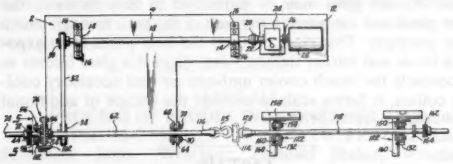


Apparatus for manufacturing glass ribbon on a bath of molten metal, comprising a tank for holding the bath and a pair of dams disposed in the bath for constituting a path for the floating glass ribbon therebetween, characterized in that between each side wall of the tank and the dam facing it there is provided means for controlling the flow of the molten metal, including apparatus to set up a forced flow of variable rate and longitudinal direction.

3,607,204
APPARATUS FOR USE IN HANDWORKING GLASS

Dudley F. Gilbertson, Jr., Box 202 Joppa Road, Warner, N.H.

Filed Jan. 30, 1969, Ser. No. 795,250
Int. Cl. C03b *9/00*
U.S. Cl. 65—228 15 Claims

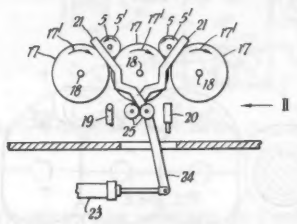


Apparatus for enabling a lone craftsman to handwork hot glass without any assistants, comprising a bench having two spaced supports each carrying a pair of parallel rollers for centering a glassworking implement thereon. One of the supports carries a driven shaft with a drive gear at one end and a pulley at the other. A blowpipe is provided with a pinion gear that can be placed in mesh with the drive gear while the blowpipe is resting on the rollers. The support also carries a clamp for locking the pinion in mesh with the drive gear. Power is transmitted to the pulley on the driven shaft through a main shaft, a drive pulley, and a belt. The main shaft is driven by a conventional, variable speed transmission powered by an electric motor. The blowpipe carries a collar that is cooperable with the rollers and abutment means on the one support for preventing the blowpipe from shifting lengthwise when its pinion is in mesh with the drive gear. The clamp is releasable so that the blowpipe can be manually shifted to take its pinion out of mesh with the drive gear. The blowpipe is then free to be hand-manipulated on the roller supports. A punty is provided with a similar pinion and collar and can be engaged with or disengaged from the drive gear in the same manner as the blowpipe. A pair of stands, each having an adjustable member carrying self-centering roller supports for the punty, are positioned in axial alignment with the blowpipe to aid in supporting or working an object on the blowpipe.

3,607,205
APPARATUS FOR HEAT-TREATING ELONGATED TUBULAR MATERIAL

Michael Latham, and Alexander Bryan Haswell, both of Durham County, England, assignors to James A. Jobling & Company, Limited, Sunderland, England

Filed Apr. 28, 1969, Ser. No. 819,629
Claims priority, application Great Britain, Apr. 30, 1968, 20519/68
Int. Cl. C03b *29/00*
U.S. Cl. 65—271 9 Claims

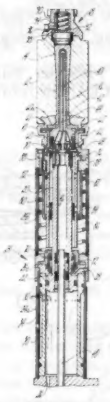


Apparatus for treating elongated tubular material comprising heating the material, prior to a further working thereof, first by subjecting the material to a stationary heat source while rotating the material, and then by oscillating a source of heat substantially in the direction of length of the material while rotating the material.

3,607,206
PARISON FORMING UNIT FOR GLASSWARE FORMING MACHINE

Thomas V. Foster, Oberengstringen, and Hermann H. Nebelung, Binz-Maur, both of Switzerland, assignors to Emhart Corporation, Bloomfield, Conn.

Filed Aug. 19, 1969, Ser. No. 851,422
Int. Cl. C03b *11/10*
U.S. Cl. 65—307 10 Claims



At the blank mold or parison forming station of a glassware forming machine a neck ring mold mates with a blank mold to form an inverted parison cavity with a top opening into which a molten glass charge is dropped. A vertically reciprocable plunger is arranged to close the bottom of the cavity and a baffle subsequently closes the top opening. A plunger operating mechanism then raises the plunger to force the molten glass charge outwardly against the walls of the cavity, and especially into the neck ring mold, after which the plunger is withdrawn, and the blank mold and baffle are removed. The neck ring then swings the inverted glass parison over to a blow mold station for further forming. The plunger is free to float laterally in its holder to accommodate

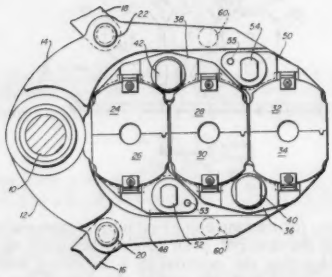
variations in alignment therebetween, and the baffle floats vertically to accommodate variations in the size of the molten glass charge.

3,607,207

TRIPLE GOB MOLD HOLDER ARM CONSTRUCTION

Franics A. Dahms, Tariffville, Conn., and Thomas V. Foster, Witikon, Switzerland, assignors to Emhart Corporation, Bloomfield, Conn.

Filed Feb. 18, 1969, Ser. No. 800,165
Int. Cl. C03b *11/16*
U.S. Cl. 65—307 **1 Claim**



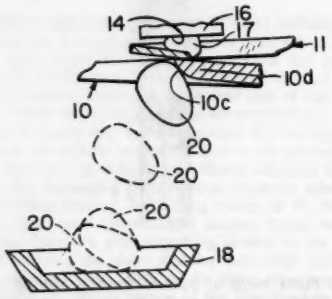
A Hartford I. S. type glassware-forming machine has a triple-gob section with a blow mold site having three individual split mold sections mounted on one primary mold holder arm and adapted to mate with three corresponding split mold sections on another primary arm to define three in-line mold cavities. One of the three split mold sections associated with each primary arm is mounted directly thereto, whereas the remaining two are mounted to a secondary arm which can float slightly in order to align all three of the cavity defining mold sections during closing movement of the primary mold holder arms.

3,607,208

MOLTEN GLASS SHEARS

George A. Kapral, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Oct. 30, 1969, Ser. No. 872,490
Int. Cl. C03b *5/38*
U.S. Cl. 65—334 **2 Claims**



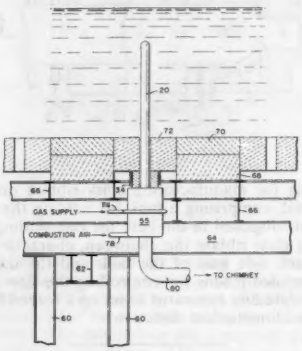
Modification of one blade of a pair of shears used for cutting off elongated mold charges from columns or streams of molten glass issuing from a discharge orifice in the bottom of a forehearth. Modification comprises increasing the thickness of the lower blade of the shears in selected regions thereof so that each mold charge, immediately following its sheared separation from a column of molten glass, is contacted and pushed by the lower surface of the lower blade and thereby turned so that it lands on its side in its forming mold cavity. Heretofore, glass-charge contact members or so-called "bumpers" were used to turn the glass charges but such devices often caused objectional "bumper marks" in the articles subsequently formed from the glass charges. Such marks are eliminated by the use of shears of the present disclosure.

3,607,209

GLASS FURNACE WITH HEAT PIPE MELTING

Lazaros J. Lazaridis, Lincoln, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

Filed May 26, 1969, Ser. No. 827,589
Int. Cl. C03b *5/04*
U.S. Cl. 65—337 **8 Claims**



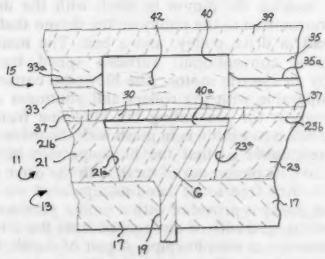
An industrial furnace for the melting of glass which includes a tank of refractory material capable of containing molten glass. Heat pipes penetrate that part of the refractory wall which is wetted by glass and are immersed in the molten glass in such a manner as to heat the glass uniformly. The heat pipes are energized from burners disposed outside the tank. Molten glass may be permitted to flow between the heat pipes and the ports in the wall of the tank through which they protrude. This glass protects the heat pipes from exposure to air and burner flames. Also, when this glass freezes as it contacts the much cooler ambient air and accessory cooling collars, it forms seals to prevent the escape of additional molten glass from the tank.

3,607,210

APPARATUS FOR CONVEYING GLASS IN A FOREHEARTH

Magnus L. Froberg, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation

Filed Feb. 23, 1968, Ser. No. 707,818
Int. Cl. C03b *5/16*
U.S. Cl. 65—346 **12 Claims**



A forehearth construction which comprises a channellike lower segment formed of refractory for conveying molten

glass, an upper segment defining a generally coextensive, generally closed chamber for confinement and circulation of burning gases to control and regulate the temperature of said molten glass in said lower segment and a barrier or shield member located between said segments, said shield being a heat conductor resistant to deformation in the temperature range 1,800° F. to 2,400° F. and resistant to refractory attacking volatiles emanating from said glass.

3,607,211
SOIL MICRONUTRIENT PRODUCT

Edward L. Cole, Fishkill, and Howard V. Hess, Glenham, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 8, 1969, Ser. No. 883,339
Int. Cl. C05f *11/02*

U.S. Cl. 71—1 **15 Claims**

A soil micronutrient product prepared from petroleum coke by oxidizing said coke with oxygen in the presence of water followed by contacting with a metal or ammonium containing cation solution to produce a family of cation exchanged derivatives of oxidized coke. The products of the invention may be used as a plant mulch, a soil conditioner, a source of carbon and trace elements for soil micro-organisms, petroleum catalyst and as a low cost ion-exchange resin.

3,607,212
A BROWN COAL FERTILIZER PRODUCT AND PROCESS FOR PREPARING SAME

Gottfried Nettesheim, Wesseling; Ernst Petzold, Grosskonigsdorf, and Hermann Pruckner, Wesseling, all of Germany, assignors to Union Rheimische Braunkohlen Kraftstoff Aktiengesellschaft, Cologne, Germany

Filed Jan. 7, 1969, Ser. No. 789,622
Claims priority, application Germany, Feb. 2, 1968, P 16 67 799.9
Int. Cl. C05f *7/00, 11/02*

U.S. Cl. 71—12 **3 Claims**

Agents for improving the fertility of soil consisting of a mixture of brown coal and a material which is capable of being decomposed by bacteria such as α-cellulose-containing waste residues, sugar-containing residues, sawdust and sewage sludge.

3,607,213
PROCESS OF PRODUCING CONCENTRATED POTASSIUM-CALCIUM PHOSPHATIC FERTILIZER

Schroeder Jerzy, Wroclaw; Zielinski Stefan, Wroclaw; Dziadur Janusz, Kwaczala; Luty Stanislaw, Kwaczala; Czunko Adam, Chrzanow, and Synowiec Jerzy, Gliwice, all of Poland, assignors to Zaklady Chemiczne, Alwernia, Poland

Filed Oct. 29, 1968, Ser. No. 771,606
Claims priority, application Poland, Nov. 2, 1967, P123361
Int. Cl. C05b *11/10, 7/00*

U.S. Cl. 71—33 **1 Claim**

Process of producing potassiumphosphatic fertilizer comprising reacting potassium chloride with phosphoric acid in amount of about 35–55 percent by weight of excess over a stoichiometric amount at 120°–350° C. and neutralizing the excess phosphoric acid with calcium oxide at the same temperature. The neutralization product is melted at 750°–1000° C. and fast cooled to ambient temperature. The fertilizer obtained is fully water-soluble and nonhygroscopic.

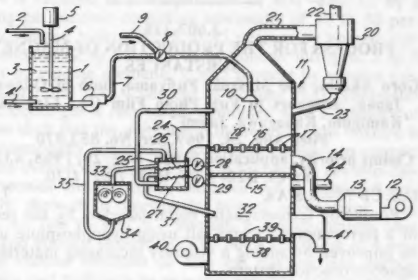
3,607,214
FLUID BED PROCESSING

Warren Jack Seiffe, Warren, Pa., assignor to Struthers Wells Corporation

Filed Apr. 5, 1968, Ser. No. 719,046
Claims priority, application Great Britain, Apr. 18, 1967, 17761/67
Int. Cl. C05b *11/10*

U.S. Cl. 71—34 **7 Claims**

Phosphate fertilizers, diammonium phosphate and triple superphosphate, are produced in a fluid bed dryer in which a



sprayed slurry forms granules which are then dried and classifed.

3,607,215
METHOD FOR THE CONTROL OF UNDESIRED VEGETATION OF PERENNIAL GRASSES WITH FLUOROPROPIONIC ACIDS AND THEIR DERIVATIVES

Shiro Watanabe, Osaka-shi; Keiichi Maruo, Suita-shi, and Hiroshi Ono, Koga-gun, all of Japan, assignors to Daikin Kogyo Co., Ltd.

Filed Feb. 17, 1969, Ser. No. 799,922
Claims priority, application Japan, Feb. 19, 1968, 43/10646
Int. Cl. A01n *9/24*

U.S. Cl. 71—113 **13 Claims**

A method for the control of undesired vegetation of perennial grasses of Cyperaceae and Gramineae which comprises applying one or more times at least one of the acids of the formula:

wherein X is chlorine or fluorine and their salts, amides and esters to the area where the herbicidal effect is desired in a total amount, which exerts no herbicidal action in an applied season, from about 5 g. to about 50 g. per area during the growing period of the grasses up to the three-leaf stage, the floral bud formation stage or the dormant tissue formation stage, or beyond so as to exert the herbicidal effect which controls the germination and growth of the grasses in the subsequent seasons by the accumulative phytotoxicity.

3,607,216
PROCESS FOR THE RECOVERY OF TIN FROM TIN ORES AND OTHER TIN-BEARING MATERIALS

Antonie C. van Elst, Velp, Netherlands, assignor to N. V. Billiton Maatschappy, The Hague, Netherlands

Filed Nov. 4, 1968, Ser. No. 773,323
Claims priority, application Netherlands, Nov. 3, 1967, 6714949
Int. Cl. C21b *1/00*

U.S. Cl. 75—1 **11 Claims**

This invention relates to a process for the recovery of tin from tin ores and other tin-bearing materials by volatilization of the tin constituents in the form of tin sulfide, and possible further processing of the tin-containing flue dust on metal, alloys or compounds, comprising carrying out the volatilization with a starting material to which an amount of phosphorus-containing material has been added in such a proportion that there is at least 0.1 gram-atom P per gram-atom Fe present in the starting mixture.

3,607,217
AGGLOMERATION OF PARTICULATE METALS

William J. Metrailer, East Baton Rouge, La., assignor to Esso Research and Engineering Company

Filed Dec. 11, 1968, Ser. No. 782,912
Int. Cl. C21b *1/28;* **C22b** *7/02, 1/10*

U.S. Cl. 75—4 **10 Claims**

Very finely divided metal particles are agglomerated in a

fluidized bed to useful larger sizes by coking heavy hydrocarbons in the bed at 850° to 1,100° F.

3,607,218
PROCESS FOR THE PRODUCTION OF MAGNETIC SUBSTANCES

Goro Akashi, and Masaaki Fujiyama, both of Odawara-shi, Japan, assignors to Fuji Photo Film Co., Ltd, Ashigara-Kamigum, Kanagawa, Japan

Filed Aug. 28, 1969, Ser. No. 853,970
Claims priority, application Japan, Aug. 29, 1968, 43/61974
Int. Cl. B22f *9/00*; H01f *1/02, 1/20*
U.S. Cl. 75—0.5 AA **7 Claims**

Producing ferromagnetic metal powders by the reduction of a ferromagnetic metal salt using hypophosphite ions can be improved by adding a viscosity increasing material to the aqueous reaction system.

3,607,219
METHOD OF PREPARING A METAL POWDER CONSISTING AT LEAST SUBSTANTIALLY OF IRON FOR MAGNETIC RECORDING

Aart Antonie Van Der Giessen, and Freerk Huizinga, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1969, Ser. No. 802,679
Claims priority, application Netherlands, Mar. 5, 1968, 6803123
Int. Cl. H01f *1/06*; B22f *9/00*
U.S. Cl. 75—0.5 BA **2 Claims**

Iron powders (which may contain, in addition, nickel and/or cobalt) to be used for magnetic recording are prepared according to the invention by reducing the metal oxidic or metal hydroxidic starting material in a finely divided state with a gaseous reduction agent (preferably hydrogen) at a pressure of at least 10 atm. The advantage hereof is that the reduction is effected at an acceptable rate at comparatively low temperatures at which sintering of the formed metal particles does not yet occur. Actually, such a sintering unfavorably affects the properties of the powders in question with a view to their usability for magnetic recording.

3,607,220
METHOD OF PREPARING A MAGNETICALLY STABLE POWDER CONSISTING MAINLY OF IRON FOR MAGNETIC RECORDING

Aart Antonie vanderGiessen, and Cornelis Johannes Klomp, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1969, Ser. No. 802,680
Claims priority, application Netherlands, Mar. 5, 1968, 6803122
Int. Cl. B22f *9/00*
U.S. Cl. 75—0.5 AA **3 Claims**

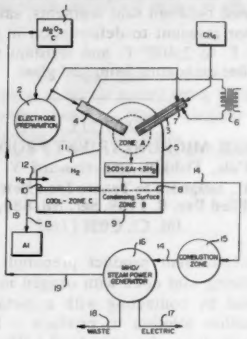
Iron powder suitable for use as a magnetic recording medium is prepared by first subjecting a finely divided iron oxide or oxyhydrate such as α-Fe_2O_3, γ-Fe_2O_3, α-FeOOH, γ-FeOOH or Fe_3O_4 to the action of a 0.002 to 1 molar solution in water of stannous chloride and thereafter reducing the iron oxide or oxyhydrate, preferably in hydrogen, followed by stabilizing the iron powder thus obtained.

3,607,221
CARBOTHERMIC PRODUCTION OF ALUMINUM

Robert M. Kibby, Florence, Ala., assignor to Reynolds Metals Company, Richmond, Va.

Filed Feb. 17, 1969, Ser. No. 799,672
Int. Cl. C22d *7/02*; C22b *21/02*
U.S. Cl. 75—10 **17 Claims**

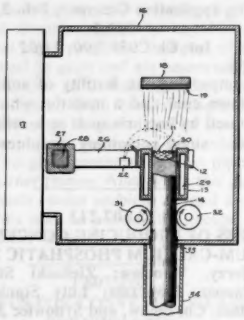
A carbothermic process for the production of substantially pure aluminum metal comprising (a) introducing a feed comprising an aluminum oxide and aluminum carbide and/or carbon into a heating zone; (b) maintaining the heating zone at an elevated temperature sufficient to quickly vaporize all products to essentially only gaseous aluminum and carbon monoxide; (c) containing the vaporous mixture in the absence of a reactive environment with a layer of liquid aluminum at a temperature sufficiently low that the vapor pressure of the liquid aluminum is less than the partial pressure of the aluminum vapor in contact with it and sufficiently high to prevent the reaction of carbon monoxide and aluminum; and (d) recovering the substantially pure aluminum.



3,607,222
METHOD FOR EVAPORATING ALLOY

Kurt D. Kennedy, Berkeley, Calif., assignor to Air Reduction Company Incorporated, New York, N.Y.

Filed Nov. 26, 1968, Ser. No. 780,613
Int. Cl. C23c *13/02*; B01d *3/10*
U.S. Cl. 75—10 V **5 Claims**



A method is described for evaporating an alloy from a single crucible in a vacuum enclosure. A solid bar of alloy is fed upwardly into the crucible from the bottom thereof. The alloy is heated to form a covering pool and to produce evaporation. The feed rate of the solid bar is regulated to maintain a substantially constant level of molten alloy relative to the crucible.

3,607,223
PRODUCTION OF LOW-DENSITY MATERIALS

John Massey Trihey, 13 Walsh St., Balwyn, Victoria, Australia

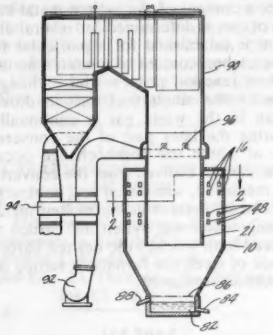
Filed June 17, 1969, Ser. No. 834,136
Claims priority, application Australia, June 19, 1968, 39,404/68
Int. Cl. C21b *5/02*
U.S. Cl. 75—20 F **4 Claims**

Low-density materials are formed by forming a molten mixture of two or more materials, one of which has a lower boiling point than the other and causing the volatilization of the lower boiling point material so as to form a foam of the higher boiling point material.

3,607,224
DIRECT REDUCTION OF IRON ORE

Henry J. Blaskowski, Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Mar. 20, 1968, Ser. No. 714,726
Int. Cl. C21b *1/02, 13/02*
U.S. Cl. 75—26 18 Claims

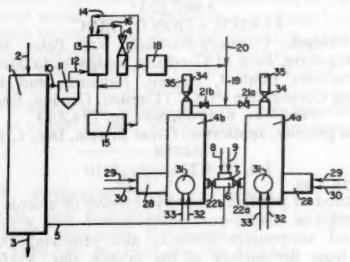


An apparatus and process for the direct reduction of iron ore to steel or high grade iron and the recovery of heat therefrom wherein pulverized coal or other carbonaceous material and oxygen or air are introduced into the upper annular portion of a reactor in a direction tangential to an imaginary circle in the annular portion so as to create a reducing atmosphere of the proper composition and temperature. Pulverized iron ore, fluxing materials and any required additional coal and oxygen are then added, also tangentially, to the reactor at a lower elevation so as to be intimately mixed. The iron ore is reduced in suspension and the molten iron or steel is tapped from the bottom of the reactor. The gaseous products of the reduction reaction are withdrawn from the reactor up through a duct which extends down through the center of the reactor and then passed to a waste heat boiler in which sensible and chemical heat are recovered.

3,607,225
PROCESS AND APPARATUS FOR THE DIRECT REDUCTION OF IRON ORES

Ovidiu Hatares cu; Iosif Tripsa, and Gheorghe Atanasiu, all of Bucharest, Romania, assignors to Institutul De Cercetari Metalurgice, Bucharest, Romania

Filed Jan. 28, 1969, Ser. No. 797,366
Claims priority, application Romania, June 22, 1965, 49,907
Int. Cl. C21b *13/02*
U.S. Cl. 75—35 3 Claims



Apparatus and process for reducing iron ore and making sponge iron therefrom wherein a reduction column is formed by charging a vertical shaft furnace with iron-oxide ore and about 5 percent coke in lump form. The iron ore of the column is reduced at a temperature of 800°–850° C. by a reducing gas mixture consisting essentially of 40 to 50 percent by volume hydrogen, 35 to 45 percent by volume carbon monoxide, 2 to 10 percent by volume nitrogen, 3 to 5 percent by volume methane, 2 to 5 percent by volume carbon dioxide and 2 to 4 percent by volume H_2O. Thereafter the hot outlet gas is recovered, combined with a quantity of methane such that the methane in the resulting gas mixture is stoichiometrically equal to the quantity necessary to convert all of the carbon dioxide and H_2O of said outlet gas into carbon monoxide and hydrogen, and reformed by passing it successively through a previously heated regenerator zone thereof to 700 to 900° C, through a nickel-catalyst zone adapted to convert substantially all but a maximum of 4 percent by volume methane of said gas mixture into carbon monoxide and hydrogen by reaction with the carbon dioxide and H_2O of the gas mixture, and through a preheated regenerator zone to raise the temperature of the reformed gas mixture to 800 to 850° C. The sponge iron is recovered along with the major part of the coke added to said column with said charge.

3,607,226
FERROUS MELTING STOCK CONTAINING A CARBON ADDITIVE AND METHOD

Richard D. Burlingame, Cleveland, Ohio, assignor to Luria Brothers & Company, Inc., New York, N.Y.

Filed Aug. 2, 1968, Ser. No. 749,612
Int. Cl. C21b *1/08, 11/00;* C21c *5/56*
U.S. Cl. 75—44 R 2 Claims

Ferrous material having a high surface to mass ratio is coated with a liquid composition comprising sodium silicate and finely divided carbon, and the coating is dried. The coated ferrous material is a suitable partial or total replacement for pig iron, or cast iron scrap in the production of cast iron or steel.

3,607,227
PRODUCTION OF SPHEROIDAL GRAPHITE IRONS

Stephen David Stephenson, and John Holt, both of Sheffield, England, assignors to National Research Development Corporation

Filed Jan. 16, 1969, Ser. No. 791,792
Claims priority, application Great Britain, Feb. 2, 1968, 5408/68
Int. Cl. C21c *1/04, 7/00*
U.S. Cl. 75—48 17 Claims

A method of producing spheroidal graphite irons from starting materials consisting predominantly or entirely or unselected ferrous scrap is provided. In the method, a ferrous bath is subjected to oxidation to remove or reduce to very low levels any elements inimical to spheroidization. The oxidation also reduces the carbon content of the bath to a relatively low level. Therefore, the method also includes the step of injecting powdered graphite by a carrier gas into the metal to restore the required carbon content of the iron. This method eliminates the necessity for selecting special starting materials and allows unselected ferrous scrap to predominantly or entirely comprise the ferrous charge.

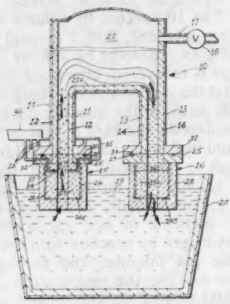
3,607,228
METHOD OF OPERATING A VACUUM DEGASSER TO EQUALIZE EROSION OF REFRACTORY LEG LINERS

David E. Todd, Butler, Pa., assignor to Armco Steel Corporation, Middletown, Ohio

Filed Jan. 13, 1969, Ser. No. 790,795
Int. Cl. C21c *7/10*
U.S. Cl. 75—49 2 Claims

A detachable end tube for the up-leg of a vacuum degassing unit having a plurality of supply ports entering adjacent the point of attachment of the end tube and terminating in the interior channel of the tube at a point remote from the point of attachment and remote from the lower end of the tube. A method of equalizing the erosion rate of the nondetachable sections of the up-leg and down-leg of a degasser

is provided which comprises removing the detachable end tube from the up-leg, attaching it to the down-leg whereby



the down-leg functions as the up-leg and vice versa, and repeating said steps at approximately equal time intervals.

3,607,229
PROCESS FOR THE PRODUCTION OF LOW CARBON STEEL

Helmut Knuppel, Sulzbach-Rosenberg Hutte, and Karl Brotzmann, Sulzbach-Rosenberg, both of Germany, assignors to Eisenwerk-Gesellschaft Maximilianshutte m.b.H.

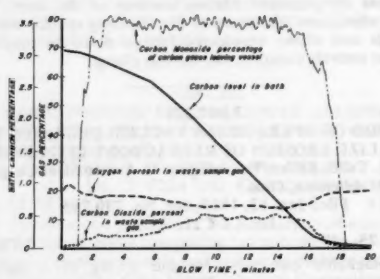
Filed Feb. 13, 1968, Ser. No. 705,018
Claims priority, application Germany, Feb. 14, 1967, E33385
VIa/18b
Int. Cl. C21c *7/10*
U.S. Cl. 75—49 **2 Claims**

A process for the production of low carbon steel from steel melts having a carbon content of about 0.04 percent and an oxygen content of between about 0.06 percent and 0.08 percent comprises vacuum degassing the melt in a vacuum chamber, preferably in portions, in the presence of granulated lime or limestone having a grain size of between 2 mm. and 1 cm., preferably between 2 mm. and 4 mm. and continuing the vacuum degassing treatment until a final carbon content in the melt of about 0.005 percent is reached.

3,607,230
PROCESS FOR CONTROLLING THE CARBON CONTENT OF A MOLTEN METAL BATH

Reginald Wintrell, Gibsonia, Pa., assignor to Koppers Company, Inc.

Filed Jan. 21, 1969, Ser. No. 792,588
Int. Cl. C21c *5/32*; **G01n** *33/20*
U.S. Cl. 75—60 **8 Claims**


Carbon Monoxide percentage of carbon gases leaving vessel
Carbon level in bath
Oxygen percent in waste sample gas
Carbon Dioxide percent in waste sample gas
BLOW TIME, minutes

In a top blown oxygen converter the carbon content of a molten metal bath is determined by measuring the amount of both carbon dioxide and unreacted oxygen in the waste gas. A phase change in the carbon-oxygen reaction process, believed to be an equilibrium phase change, occurs during the latter stages of the oxygen-blowing process and is indicated by a simultaneous rapid decrease in the amount of carbon dioxide and a rapid and continuous increase in the amount of unreacted oxygen in the waste gas. The carbon content of the molten metal bath when this phase change occurs is substantially the same for all of the heats in a given converter or furnace that is supplied with oxygen at substantially the same rate. The carbon content of the molten-metal bath when the phase change occurs is determined for several different heats and a constant is established for a particular furnace. This constant is the carbon content of a molten-metal bath at the time the carbon reaction process phase change occurs. In subsequent heats the amount of carbon dioxide and unreacted oxygen in the waste gas is continually measured, preferably during the later part of the conversion process, and the time at which the phase change occurs is noted. Thereafter, the carbon evolved from the converter as a gas is continuously measured, summated and subtracted from the carbon known to be present in the molten metal bath when the phase change occurred. When the carbon remaining in the molten metal bath reaches the desired carbon level for a particular grade of steel, the furnace is turned down and the conversion process terminated.

3,607,231
METHOD FOR PURIFICATION OF COPPER

Thomas Gordon Hart, Cranbury, N.J., assignor to Phelps Dodge Corporation, New York, N.Y.

Continuation of application Ser. No. 478,612, Aug. 10, 1965, now abandoned. This application Dec. 10, 1969, Ser. No. 884,026
Int. Cl. C22b *15/14*
U.S. Cl. 75—72 **5 Claims**

Copper is refined by dissolving into the copper substantial amounts of hydrogen to aid in the removal of oxygen impurities. The molten copper is subjected to vacuum treatment to remove the excess hydrogen, thereby causing agitation of the molten copper to improve the removal of volatile impurities.

3,607,232
REFINING LEAD

Yurii E. Lebedeff, Edison, N.J., and William C. Klein, deceased, late of Menlo Park, N.J., assignors to American Smelting and Refining Company, New York, N.Y.

Filed June 9, 1969, Ser. No. 831,698
Int. Cl. C22b *13/06*
U.S. Cl. 75—78 **9 Claims**

Softened lead, prior to desilverizing, is detellurized (i.e. tellurium is removed from the lead) by adding sodium or potassium to a pool of the molten softened lead, agitating the molten pool while maintaining the temperature of the molten lead below 1,200° F. to remove tellurium from the lead and incorporate the removed tellurium into a layer of slag overlying the pool, discontinuing the agitation before an undesired amount of the removed tellurium is reincorporated into the molten lead from the overlying slag and removing the slag from the molten lead pool.

3,607,233
PURIFICATION OF ZINC

Helmut Maczek, Duisburg-Buchholz, and Peter Manthey, Duisburg-serm, both of Germany, assignors to Metallurgical Processes Limited, Nassau, Bahamas and Imperial Smelting Corporation (N.S.C.) Limited, London, England

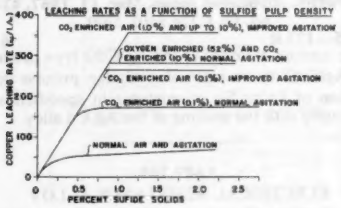
Filed Nov. 8, 1968, Ser. No. 774,503
Claims priority, application Great Britain, Dec. 1, 1967, 54758
Int. Cl. C22b *9/00, 9/10*
U.S. Cl. 75—86 **6 Claims**

A method of purifying zinc by removal of arsenic consists of treating the arsenic-containing molten zinc with sodium metal and ammonium chloride and removing the dross formed from the surface of the molten zinc. Preferably a dross-conditioning agent such as sawdust or coke breeze is added before removing the dross. Aluminum may be used in addition to the sodium and ammonium chloride in the purification process.

3,607,234
STEEL-REFINING COMPOSITION CONTAINING PORTLAND CEMENT AND FLUORSPAR
Takaho Kawawa; Noburo Shimada; Masaji Kogi, and Hidetaro Nemoto, all of Kawasaki-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Japan
Filed June 4, 1969, Ser. No. 830,341
Claims priority, application Japan, June 8, 1968, 39086
Int. Cl. C22b *9/10*
U.S. Cl. 75—96 **6 Claims**

A steel-refining agent which is composed of 35% to 65% of Portland cement, 5% to 20% of fluorspar, 20% to 40% of Chamotte powder, 2% to 15% of soda ash, 2% to 15% of a carbon source, which is coke breeze or graphite powder, and further 2% to 15% of borax, wherein more than 50% of mixing particles have a diameter of less than 0.044 mm.

3,607,235
RAPID BACTERIOLOGICAL METAL EXTRACTION METHOD
Douglas W. Duncan, West Vancouver, British Colombia, and Cecile J. M. McGoran, Vancouver, British Colombia, both of Canada, assignors to British Columbia Research Council, Vancouver, British Columbia, Canada
Filed Feb. 23, 1968, Ser. No. 707,501
Int. Cl. C22b *3/00*
U.S. Cl. 75—101 **18 Claims**


LEACHING RATES AS A FUNCTION OF SULFIDE PULP DENSITY
CO₂ ENRICHED AIR (1.0 % AND UP TO 10%), IMPROVED AGITATION
OXYGEN ENRICHED (52%) AND CO₂ ENRICHED (10%) NORMAL AGITATION
CO₂ ENRICHED AIR (0.1%), IMPROVED AGITATION
CO₂ ENRICHED AIR (0.1%), NORMAL AGITATION
NORMAL AIR AND AGITATION
COPPER LEACHING RATE (mg/L/hr.)
PERCENT SUFIDE SOLIDS

Method of rapid bacteriological extraction of metals from materials containing sulfides by subjecting to agitation a pulp comprising particles of said materials and an aqueous acid leaching medium including sulfide-oxidizing bacteria, while simultaneously aerating the pulp with air enriched with carbon dioxide.

3,607,236
RECLAIMING OF SUPERALLOY SCRAP
Parkman T. Brooks, and Dale A. Martin, both of Salt Lake City, Utah
Filed Sept. 22, 1969, Ser. No. 859,939
Int. Cl. C22b *7/00*
U.S. Cl. 75—101 R **22 Claims**

Valuable metals are recovered from superalloy scrap by a series of process steps comprising (1) dissolution of the scrap in chlorinated acidic aqueous solution, (2) removal of tungsten and silica by adsorption on activated carbon, (3) extraction of molybdenum with a water-immiscible organic phosphate or phosphonate, (4) extraction of iron with a water-immiscible secondary amine, (5) extraction of cobalt with a water-immiscible tertiary amine, (6) precipitation of chromium as a hydrous basic sulfate, and nickel recovery.

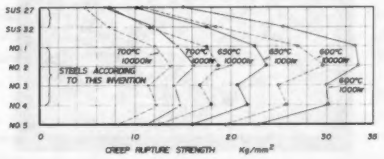
3,607,237
FERRITIC STAINLESS STEEL
Wesley Kalita, New Kensington, Pa., assignor to Allegheny Ludlum Steel Corporation, Pittsburgh, Pa.
Filed Feb. 26, 1969, Ser. No. 802,632
Int. Cl. C22c *37/10, 39/02*
U.S. Cl. 75—124 **5 Claims**

A ferritic-type stainless steel suitable for manufacture into sheet and strip form that can be used for production operations involving stamping, punching, piercing, blanking and drawing by high-speed press production.

3,607,238
HEAT-RESISTANT TO LOW CHROMIUM-NICKEL ALLOY STEEL FOR LARGE FORGINGS
Kenneth Arnold Ridal, and John McCann, both of Yorkshire, England, assignors to English Steel Corporation Limited, Sheffield, England
Filed June 19, 1968, Ser. No. 738,102
Claims priority, application Great Britain, June 29, 1967, 30166/67
Int. Cl. C22c *39/20*
U.S. Cl. 75—128 **4 Claims**

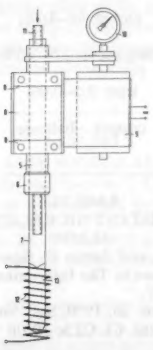
A heat-resistant alloy steel which is basically a 1 percent chromium-molybdenum-vanadium steel with the addition of from 0.03 to 0.15 percent by weight niobium and from 0.002 to 0.010 percent by weight boron. High hardenability and good high temperature ductility and creep properties are developed by austenitising the steel in the range 950° C. to 980° C., hardening by cooling to obtain a mainly bainitic structure, and tempering in the range 650° C. to 720° C. for at least 12 hours.

3,607,239
AUSTENITIC HEAT RESISTING STEEL
Tohru Mimino; Kazuhisa Kinoshita; Takayuki Shinoda, and Isao Minegishi, all of Kawasaki-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha
Filed Nov. 6, 1968, Ser. No. 773,788
Claims priority, application Japan, Nov. 10, 1967, 42/71953
Int. Cl. C22c *39/20*
U.S. Cl. 75—128 G **1 Claim**



Cr-Ni type austenitic heat resisting steel having about twice the heat resistibility of common stainless steel by the addition of 0.001% to 0.30% by weight Ti, 0.001% to 0.30% by weight Nb + Ta and 0.05% to 2.50% by weight V to a well-known Cr-Ni type steel composition for elevated temperature service.

3,607,240
SOLDER FOR CONTACTING A SEMICONDUCTOR BODY AND METHOD FOR ITS PRODUCTION
Alfred Kunert, and Gerhard Oesterhelt, both of Nurnberg, Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany
Filed July 23, 1969, Ser. No. 843,976
Claims priority, application Germany, July 24, 1968, P 17 58 701.8
Int. Cl. C22c *5/00;* **B23k** *1/04;* **H01v** *1/00*
U.S. Cl. 75—134 N **16 Claims**



A solder for contacting a semiconductor body with a contact piece, whereby silicon constitutes an alloying component

of the semiconductor body. The solder composition is:

$$Pd_x((Me'_yMe''_{1-y})_zSi_{1-z})_{1-x}$$

with

$$0.25 \leq x \leq 0.60$$

$$0.20 \leq y \leq 0.90$$

$$0.05 \leq z \leq 0.35$$

wherein Me' is molybdenum or tungsten and Me'' is iron, nickel, or cobalt.

3,607,241

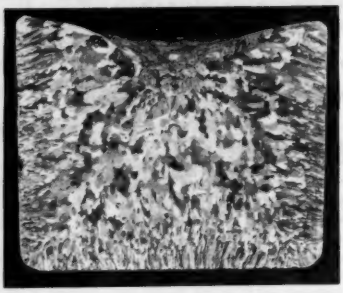
ALUMINUM-CASTING GRAIN REFINEMENT

Gustaf F. Bolling, Dearborn; Jean Cisse, Dearborn Heights, and Gerald S. Cole, Dearborn, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1969, Ser. No. 839,474

Int. Cl. C22c *1/10*

U.S. Cl. 75—138 **1 Claim**



This invention teaches a method of controlling the size of the grain structure in aluminum and aluminum-based alloys employing as the novel grain-refining addition silver oxide. The added silver oxide promptly reacts with the molten aluminum to produce silver which dissolves in the aluminum and freshly precipitated and very active aluminum oxide which acts as a potent grain-refining agent.

3,607,242

ELECTRICAL RESISTANCE ALLOY

Arnold J. Gottlieb, Colonia, and Teh Po Wang, Cedar Grove, both of N.J., assignors to Wilbur B. Driver Co.

Filed May 22, 1969, Ser. No. 827,027

Int. Cl. C22c *9/06*

U.S. Cl. 75—159 **4 Claims**

An electrical alloy which is essentially free of cobalt and carbon and comprising, as expressed in percent by weight:

nickel: 40–46%;

manganese: 2.5–3.5%;

iron: 0.5–0.6%

copper—balance

3,607,243

CORROSION RESISTANT NICKEL-CHROMIUM-IRON ALLOY

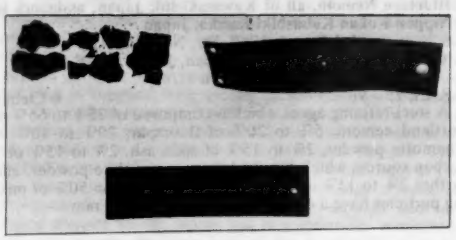
Herbert L. Eiselstein, and James C. Hosier, both of Huntington, W. Va., assignors to The International Nickel Company Inc., New York, N.Y.

Filed Jan. 26, 1970, Ser. No. 5,691

Int. Cl. C22c *19/00*

U.S. Cl. 75—171 **2 Claims**

Directed to an alloy having improved oxidation resistance and particularly improved resistance to the effects of cyclic oxidation at high temperatures, e.g., 2,000° F., wherein the alloy contains about 21 to 25% chromium, about 58% to



63% nickel, about 1% to 1.7% aluminum and the balance essentially iron.

3,607,244

ELECTRIC CONTACT MATERIAL AND METHOD OF MAKING THE SAME

Sukeaki Kabayama, Suita-shi, and Eiji Kamijyo, Takatsuki-shi, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Mar. 6, 1968, Ser. No. 710,767

Claims priority, application Japan, Mar. 11, 1967, 42-15522

Int. Cl. C22c *1/10*, *5/00*

U.S. Cl. 75—173 R **6 Claims**

Electric contact material of the Ag-CdO type produced by forming AgICdO by an internal oxidation process including the addition of Fe or Sn or mixtures in specified amounts simultaneously with the melting of the Ag-Cd alloy.

3,607,245

ELECTRICAL RESISTANCE ALLOY

Arnold J. Gottlieb, Colonia, and C. Dean Starr, Whippany, both of N.J., assignors to Wilbur B. Driver Company

Filed May 28, 1968, Ser. No. 732,518

Int. Cl. C22c *19/00*, *27/00*

U.S. Cl. 75—122 **4 Claims**

An alloy primarily adapted for use as an electrical heating element which utilizes iron, nickel, chromium and silicon as major constituents together with aluminum, calcium, zirconium and one or more rare earth metals as minor constituents.

3,607,246

FERRITIC STAINLESS STEEL

Wesley Kalita, New Kensington, Pa., assignor to Allegheny Ludlum Steel Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1969, Ser. No. 802,631

Int. Cl. C22c *37/10*, *39/14*

U.S. Cl. 75—124 **5 Claims**

A ferritic-type stainless steel suitable for manufacture into sheet and strip form that can be used for production operations involving stamping, punching, piercing, blanking and drawing by high-speed press production.

3,607,247

PROCESSES FOR THE OXYGEN CONVERTER PRODUCTION OF STAINLESS STEELS

Clifford W. McCoy, Oakdale; Eugene L. Kern, Beaver, and George A. Smith, Beaver, all of Pa., assignors to Crucible Inc., Pittsburgh, Pa., by said McCoy and Smith

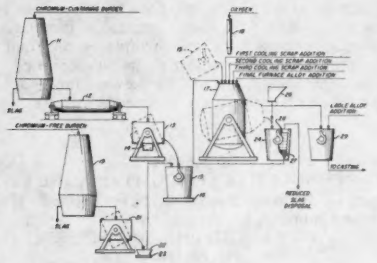
Continuation-in-part of application Ser. No. 545,480, Apr. 26, 1966, now abandoned. This application Nov. 12, 1968, Ser. No. 805,915

Int. Cl. C21c *5/32*; C22c *39/14*

U.S. Cl. 75—46 **2 Claims**

A channel furnace is used to mix chromium-containing and chromium-free hot metals, producing a converter feed metal of desired temperature and chemical composition. Weighed

charges of such feed metal are blown in the converter. This makes practical the production of stainless steel from ore

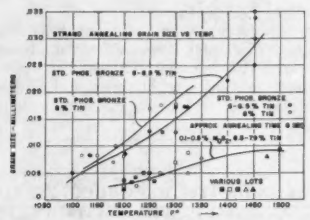


without use of an electric furnace. The time and the electricity saved yield cost savings.

3,607,248
STRENGTHENING MECHANISM FOR COPPER BASE ALLOYS

Edgar C. Wallace, Cleveland, Ohio, assignor to W. S. Tyler Inc., Cleveland, Ohio

Filed Dec. 4, 1968, Ser. No. 781,208
Int. Cl. C22c *9/02*
U.S. Cl. 75—154 **14 Claims**


STRAND ANNEALING GRAIN SIZE VS TEMP.
STD. PHOS. BRONZE 5-8.5% TIN
STD. PHOS. BRONZE 8% TIN
STD. PHOS. BRONZE 5-6.5% TIN
6% TIN
APPROX. ANNEALING TIME 6 SEC.
GRAIN SIZE - MILLIMETERS
VARIOUS LOTS
TEMPERATURE °F

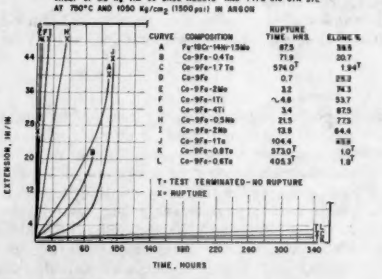
A copper base alloy including about 0.25 percent–11 percent tin and about 0.1 percent–0.5 percent molybdenum disulfide.

A method of producing a copper base alloy of improved antifriction characteristics, strength, modulus of elasticity, hardness and resistance to corrosion by adding about 0.1 percent–0.5 percent molybdenum disulfide.

3,607,249
COBALT-IRON-TANTALUM HIGH-TEMPERATURE-STRENGTH ALLOY

Fred C. Robertshaw, Cincinnati, and Jon L. Bartos, Loveland, both of Ohio

Filed Jan. 20, 1970, Ser. No. 4,375
Int. Cl. C22c *19/00*
U.S. Cl. 75—170 **1 Claim**


CREEP OF 3.2 Kg VIM Co BASE ALLOYS AND TYPE 316 STN STL AT 750°C AND 1050 Kg/cm² (1500 psi) IN ARGON
CURVE COMPOSITION RUPTURE TIME, HRS. ELONG %
A Fe-19Cr-14Ni-13Mo 87.5 39.5
B Co-9Fe-0.4Ta 71.9 20.7
C Co-9Fe-1.7 Ta 574.0† 1.94†
D Co-9Fe 0.7 28.3
E Co-9Fe-2Mo 3.2 74.3
F Co-9Fe-1Ti ~0.48 53.7
G Co-9Fe-4Ti 3.4 87.5
H Co-9Fe-0.5Nb 21.5 77.3
I Co-9Fe-2Nb 13.8 64.4
J Co-9Fe-1Ta 104.4 45.8
K Co-9Fe-0.8Ta 573.0† 1.0†
L Co-9Fe-0.6Ta 405.3† 1.9†
† = TEST TERMINATED—NO RUPTURE
X = RUPTURE
EXTENSION, IN/IN
TIME, HOURS

This invention covers a cobalt-base alloy consisting essentially of, in atom percent, 8–12 percent iron, 0.4 to 1.7 percent tantalum, and the remainder cobalt.

3,607,250
HIGH-TEMPERATURE ALLOYS AND ARTICLES

Ray H. English, McCandless Township, Allegheny County, and Martin N. Ornitz, Pittsburgh, both of Pa., assignors to Blaw-Knox

Continuation-in-part of application Ser. No. 623,746, Mar. 16, 1967, now abandoned. This application Jan. 12, 1970, Ser. No. 2,432
Int. Cl. C22c *19/00*, *19/04*
U.S. Cl. 75—171 **3 Claims**

A new high-temperature alloy having high creep resistance and improved load fracture properties at temperatures of 2,000° F. and above comprising about 0.35% to 0.75% carbon, at least about 0.2% manganese, up to about 2% silicon, about 40% to 55% nickel, about 22% to 33% chromium, about 4% to 6% tungsten, about 1% to 4.5% cobalt and the balance iron with usual impurities in ordinary amounts.

3,607,251
MOLYBDENUM IN CARBON CONTAINING NIOBIUM-BASE ALLOYS

Friedrick G. Ostermann, Yellow Springs, Ohio

Filed Apr. 18, 1969, Ser. No. 817,559
Int. Cl. C22c *27/00*
U.S. Cl. 75—174 **2 Claims**

Niobium-base alloys containing at least 20 weight percent molybdenum, small amounts of carbon, and small amounts of zirconium, hafnium, titanium, or mixtures thereof. Molybdenum prevents the formation of undesirable Nb_3C_2 and greatly inhibits the formation of undesirable Nb_2C during cooling of the alloy after its initial heat treatment (solution annealing). The alloy must contain at least 20 weight percent molybdenum in order for the final product to be substantially free of the undesirable niobium carbides. By preventing the formation of the niobium carbides, the molybdenum causes carbon to be free to react with zirconium, hafnium, titanium, or mixtures thereof and form desirable carbides with those elements during a second heat treatment. The alloys of this invention are useful where strong, lightweight materials are needed such as in the manufacture of jet engine turbines.

3,607,252
SOLDER ALLOY COMPOSITION

Robert E. North, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed June 2, 1969, Ser. No. 829,791
Int. Cl. C22c *13/00*
U.S. Cl. 75—175 A **1 Claim**

A composition of matter used in the assembly of products requiring both electrical and mechanical connections. The composition is of a solder alloy of tin, antimony, copper and lead having improved creep strength for mechanical connections with a sufficiently low melt temperature to permit the dip-soldering of electrical connections on electronic assemblies.

3,607,253
TIN BASE SOLDER ALLOY

John F. Cain, Endicott, and Octavio I. Chirino, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1969, Ser. No. 888,049
Int. Cl. C22c *13/00*
U.S. Cl. 75—175 A **2 Claims**

A tin base solder alloy containing 1–5 percent by weight bismuth.

This invention pertains to solder alloys useful in electrical applications and in particular to a high creep strength tin base solder containing bismuth.

3,607,254

DISPERSION STRENGTHENING OF ALUMINUM ALLOYS BY REACTION OF UNSTABLE OXIDE DISPERSIONS

Joseph P. Hammond, Knoxville, Tenn.

Filed Oct. 18, 1968, Ser. No. 768,638
Int. Cl. B22f 9/00
U.S. Cl. 75—214 2 Claims

A method for preparing dispersion-strengthened metal consisting predominantly of aluminum metal as the metal matrix is provided comprising ball milling said metal as a powder with an unstable oxygen compound whose free energy of formation per gram-atom of oxygen at 500° C. is less than that of the oxide of said metal matrix and which undergoes reaction with said metal matrix at said temperature to form a stable oxide dispersant in a hermetically sealed mill under an inert atmosphere in the presence of a grinding liquid. The resulting flake metal having homogeneous dispersions of the included oxide is then reacted in a nonoxidizing environment at a temperature of about 500° C., pressed, and hot extruded to form the dispersion strengthened product. Extruded bar material containing only 4 weight percent oxide dispersant exhibited super elevated temperature strength when compared to conventional sintered aluminum product containing up to 15 weight percent oxide dispersant. Another alloy showed improved low strain rate fracture ductility with good strength at high temperature when compared to sintered aluminum products.

3,607,255

SURFACING NONIMAGE AREAS OF LITHOGRAPHIC MASTER WITH HYDROPHILIC DESENSITIZING COMPOSITION

Sangho E. Back, Vancouver, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Jan. 22, 1968, Ser. No. 699,341
Int. Cl. G03g 5/00; B41n 1/00
U.S. Cl. 96—1 7 Claims

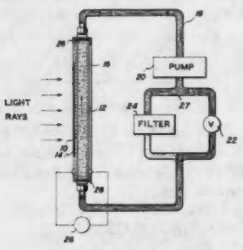
A convertible plate adapted for conversion into a lithographic offset master comprising a paper web, and a dielectric film extending over the paper web with finely divided silica distributed therein. In preparing an offset master, an image-defining electrostatic charge is laid down on the film and developed with toner to form an image, and nonimage areas are rendered hydrophilic to prepare the plate for lithographic printing by coating the nonimage areas with a desensitizing composition comprising an aqueous solution of polyvinyl alcohol which mechanically fixed to the dielectric film through adhesion promoted by the divided silica.

3,607,256

FULLY ENCLOSED ELECTROPHORETIC-IMAGING SYSTEM

Morton Silverberg, Pittsford, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed July 19, 1968, Ser. No. 746,177
Int. Cl. G03g 13/00
U.S. Cl. 96—13 5 Claims



A display system which responds to a light image to form a viewable image. The system is sealed and is filled with a fluid carrying a dilute suspension of electrically photosensitive particles between two conductive plates. If an image is focused onto the space between the plates and a voltage established therebetween, the particles in contact with the inner surface of the conductive plates will migrate from light-struck areas of the plates. After the fluid has been circulated for an appropriate time after imaging, the fluid circulation is directed through a filter, which replaces the fluid between the plates with fluid having the undeposited particles removed. Various provisions for viewing the images formed within the display system are described.

3,607,257

PHOTOCONDUCTIVE COMPOSITIONS AND ELEMENTS

Arthur L. Johnson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 27, 1968, Ser. No. 755,711
Int. Cl. G03g 5/04
U.S. Cl. 96—1.6 33 Claims

Photoconductive compositions and elements containing as photoconductors organometallic compounds derived from Group IIIa metals are described.

3,607,258

ELECTROPHOTOGRAPHIC PLATE AND PROCESS

Helmut Hoegl, Grand-Lancy/Geneve, and Giacomo Barchietto, Petit-Lancy/Geneve, both of Switzerland, assignors to Xerox Corporation, Rochester, N.Y.

Filed Jan. 6, 1966, Ser. No. 519,081
Int. Cl. G03g 5/04, 13/22
U.S. Cl. 96—1.5 5 Claims

A photoconductive plate comprising a photoconductive charge transfer complex composition overcoated with a thin layer of an insulating material, preferably less than one micron thick, is disclosed. The use of this photoconductive plate in an electrostatic imaging capacity is further disclosed.

3,607,259

PHOTOCONDUCTIVE RECORDING ELEMENTS FOR ELECTROPHOTOGRAPHY RECORDING ELEMENTS

Robert J. Wright, Tranmere, Australia, assignor to Research Laboratories of Australia Pty. Limited, North Adelaide, Australia

Filed Dec. 27, 1967, Ser. No. 693,729
Claims priority, application Australia, Jan. 6, 1967, 16193
Int. Cl. G03g 5/06, 13/02
U.S. Cl. 96—1.5 1 Claim

An electrophotographic recording element which is precharged and held in charged condition for subsequent reuse, utilizing a backing member of a resistivity sufficient to prevent leakage away of the applied charge which can be rendered at least temporarily conductive prior to exposure to permit the charge to leak away at image areas.

3,607,260

MIXED-RESIN BINDERS FOR ELECTROPHOTOGRAPHIC PLATES

Karel Eugeen Verhille, Mortsel-Antwerpen, and Andre Jan Conix, Antwerpen, both of Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Continuation of application Ser. No. 560,791, June 27, 1966, now abandoned. This application Oct. 29, 1969, Ser. No. 872,425
Int. Cl. G03g 5/06, 5/08
U.S. Cl. 96—1.8 7 Claims

Electrophotographic recording material having a layer of finely divided photoconductor, preferably photoconductive zinc oxide dispersed in an insulating binder medium which is the cured reaction product of a mixture of a melamine-formaldehyde resin and a salt of a volatile base and an alkyd resin which contains free acid groups and is insoluble in water in acidic form, both the melamine-formaldehyde resin and the salt being water soluble prior to curing. The layer is preferably applied from an aqueous alkaline coating composition. A preferred range of proportions is 90–40 percent of the melamine resin and 10–40 percent of the salt.

3,607,261

INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES

Alan B. Amidon; Joseph Mammino, and Richard Radler, all of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 546,844, May 2, 1966.
Filed Apr. 4, 1969, Ser. No. 829,835
Int. Cl. G03g *13/22, 5/04*
U.S. Cl. 96—1.8 **7 Claims**

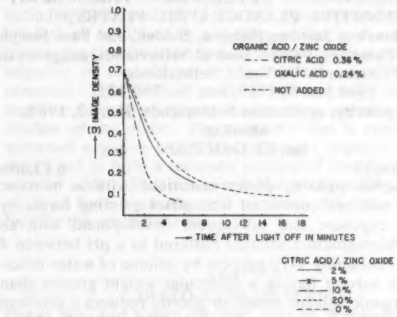
An electrophotographic material is disclosed comprising a support substrate and an inorganic crystalline photoconductive insulating layer. The photoconductive coating comprises a photoconductive material and an inorganic crystalline binder.

3,607,262

ZINC OXIDE BINDER PLATE FOR CHARGELESS ELECTROPHOTOGRAPHY

Yasuo Ueda, # 3-32, Kitano-cho, Ikuta-ku, Kobe-Hyogo; Akira Takatsu, #3-5-16, Kusatsu-cho, Kusatsu-Siga, and Tatsuo Aizawa, # 6-34, Kuwazu-cho, Higashisumiyoshi-ku, Osaka, all of Japan

Filed Nov. 13, 1967, Ser. No. 682,079
Claims priority, application Japan, Nov. 26, 1966, 41/77666
Int. Cl. G03g *13/22, 5/08*
U.S. Cl. 96—1.8 **2 Claims**



An electrophotographic plate for chargeless electrostatic printing and the method of making the same using a photoconductive material such as microcrystalline zinc oxide and a binder of suitable type with an organic acid such as citric, oxalic or malic and mixing the ingredients and applying them to a baseplate in the desired proportions to control the sensitivity of the electrophotographic plate to light and to control the recovery of memory effect so that the electrophotographic plate can be subject to ordinary light and still be usable for reproduction by being placed in the dark for a short period of time so that the recovery of the memory effect takes place and the electrophotographic plate can then be used for reproduction thereby greatly simplifying the storage of the electrophotographic plates and also greatly simplifying the manufacture thereof. The electrophotographic plate having a smooth glossy surface thereby preventing adherence of the toner to the nonimage areas.

3,607,263

PHOTOGRAPHIC REVERSAL COLOR PROCESS

Julius Battaglini, Fairport; John H. Goselin, Rochester, and Walter P. Horylev, Hilton, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 24, 1969, Ser. No. 862,158
Int. Cl. G03c *5/50*
U.S. Cl. 96—22 **7 Claims**

A reversal color development process in photography is carried out at elevated temperatures using a first black-and-white silver halide developing solution at pH of about 9.1 to 9.6 and containing hydroquinone and an amount of 3-pyrazolidone silver halide developing agent sufficient to inhibit fog on development of aged emulsion layers. This minimizes the density losses obtained with aged color films compared to fresh color films.

3,607,264

IMAGE REPRODUCTION PROCESS INVOLVING PHOTOHARDENING AND DELAMINATION

Jack Richard Celeste, Westfield, and Victor Fu-Hua Chu, East Brunswick, both of N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 22, 1967, Ser. No. 684,945
Int. Cl. G03c *11/12, 5/00*
U.S. Cl. 96—28 **14 Claims**

An image reproduction process in which an element having a support, a photohardenable layer, and an integral, laminated, adherent receptor sheet is (1) exposed, imagewise, to actinic radiation to harden the layer in exposed areas without hardening in the underexposed areas, and (2) delaminated at a temperature above 45° C., causing the unhardened areas of the layer to fail cohesively, whereby a stratum of the unhardened material adheres to the receptor sheet.

3,607,265

METHOD OF PREPARING A COLOR SUBTRACTIVE MASK

Ramon Bergero, Inglewood, Calif., assignor to Gordon Baskin, Hollywood, Calif.; Jason Tarser, Hollywood, Calif. and Attel, Inc., Los Angeles, Calif.

Filed Aug. 25, 1969, Ser. No. 852,890
Int. Cl. G03c *5/04;* **G03f** *7/00*
U.S. Cl. 96—27 **9 Claims**

A method of preparing a color subtractive mask for a color matrix to be used for the reproduction of images appearing on a color print, the matrix defining a pattern of identical red, blue and green spot groups similar to that utilized in color television interlace scanning, wherein spot areas of the color print in a pattern corresponding to the matrix spot group pattern are selectively photographed on black and white film through appropriate color filters so that the light exposures of the film spots corresponding to the respective matrix red, blue and green spots are in accordance with the intensities of the respective red, blue and green color components at the corresponding areas of the color print, the relative light intensity information from a resulting matrix size negative being transferred onto a matrix sheet mask to form mask apertures, the size of each aperture being determined by the intensity of the light recorded on the corresponding negative pattern spot.

3,607,266

IMAGE INTENSIFICATION PROCESS FOR SENSITIZED FILM

Yoshikazu Yamada, Sierra Madre, and Thomas H. Garland, El Monte, both of Calif., assignors to Bell & Howell Company, Chicago, Ill.

Continuation-in-part of application Ser. No. 523,705, Jan. 28, 1966, now Patent No. 3,503,745, which is a continuation-in-part of application Ser. No. 481,759, Aug. 23, 1965, now Patent No. 3,476,562, which is a continuation-in-part of application Ser. No. 352,625, Mar. 17, 1964, now abandoned , which is a continuation-in-part of application Ser. No. 278,050, May 6, 1963, now abandoned. This application Apr. 17, 1967, Ser. No. 631,502
Int. Cl. G03c *5/04, 5/24*
U.S. Cl. 96—27 **15 Claims**

Methods for increasing the effective speed of photosensitive compositions and compositions modified to be sensitive to light levels lower than ordinarily useful for inducing a developable latent image. Such image is induced and is intensified upon exposure to radiation in a spectral region to which the unmodified composition has comparably low sensitivity.

3,607,267

PRECISION ALIGNMENT OF PHOTOGRAPHIC MASKS

Betty Margaret Garrels, Phoenix, Ariz., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Oct. 9, 1967, Ser. No. 673,704
Int. Cl. G03c 5/04
U.S. Cl. 96—27 15 Claims

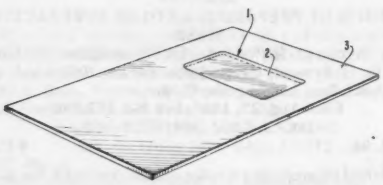
A photographic mask comprising an array of transparent patterns on an opaque background is provided with a plurality of opaque key images on transparent backgrounds to facilitate precision alignment of the mask within a tolerance limit down to ±0.1 mil or better, limited only by the photographic equipment used for producing the master plate. The opaque key images occupy positions of the same array as said transparent patterns, and also have the same size and shape as the transparent patterns.

3,607,268

PROCESS FOR PROVIDING APERTURE-TYPE FILM RECORD CARDS

Eugene R. Skarvinko, Binghamton, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 31, 1968, Ser. No. 749,184
Int. Cl. G03c 15/04
U.S. Cl. 96—27 R 9 Claims



A method for providing film record cards whereby a film-forming solution, emulsion or latex is poured into the aperture of a card structure while said card structure is supported on a base which is nonadherent to said film, and is dried so as to form a strongly adherent film to the peripheral edges of said aperture. Film record cards prepared by the foregoing method.

3,607,269

IMAGE-RECEIVING ELEMENTS AND PHOTOGRAPHIC PROCESSES EMPLOYING SAME

Richard W. Young, Wellesley, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 1, 1968, Ser. No. 717,683
Int. Cl. G03c 1/48, 5/54
U.S. Cl. 96—29 25 Claims

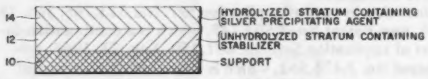


Image receiving elements and diffusion processes employing such elements are disclosed, wherein the element comprises a support carrying a layer composed of at least two strata, including a first stratum which comprises regenerated cellulose containing a silver precipitating agent and a mercapto substituted compound, and a second stratum comprising a alkali hydrolyzable cellulose ester. Reagents initially located in a stratum of unhydrolyzed polymer are extracted from the unhydrolyzed polymer in a controlled manner during processing.

3,607,270

UNITARY, PERMANENTLY COMPOSITE, PHOTOGRAPHIC LIGHT-SENSITIVE SHEET MATERIAL FOR USE IN THE SILVER COMPLEX DIFFUSION TRANSFER PROCESS FOR PRODUCING IMAGES

Louis de Haes, Edegem; Emiel Alexander Hofman, Mortsel, and Hugo Karel Gevers, Edegem, all of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed June 10, 1968, Ser. No. 735,577
Claims priority, application Great Britain, June 8, 1967, 26,580/67
Int. Cl. G03c 5/54
U.S. Cl. 96—29 15 Claims

A good quality reproduction can be obtained by the silver complex diffusion transfer process in a unitary permanently composite sheet material comprising of a nontransparent flexible sheet support, a light-sensitive silver halide emulsion layer and a layer containing an opaque white or colored pigment and a hydrophilic colloid binder, provided the pigment is present in amounts from 9–25 g. per sq.m. and the binder therefore in 0.5–3 g. per sq.m. and at least one photographic developing agent for the silver halide is contained in the material. Development nuclei for the complex silver halide can be supplied in an outer stratum of the pigmented layer or in a thin colloid layer superimposed thereon or can be incorporated in situ by means of a treatment bath containing the same which can be the alkaline processing liquid for forming the diffusion transfer image. Light-sensitive unitary composite materials useful for this purpose are also described.

3,607,271

PHLOROGLUCINOL DEVELOPER FOR LINGT-SENSITIVE PLANOGRAPHIC PLATES

Aloysius Henricus Jacobus Hilhorst, Helden, and Paul Joseph Hubert Tummers, Velden, both of Netherlands, assignors to Van Der Grinten N. V., Venlo, Netherlands

Filed Jan. 9, 1969, Ser. No. 790,175
Claims priority, application Netherlands, Jan. 12, 1968, 6800538
Int. Cl. G03f 7/02
U.S. Cl. 96—33 6 Claims

Planographic printing plates sensitized with a benzene diazonium salt are converted into offset printing forms by imagewise exposure and subsequent development with an aqueous phloroglucinol solution buffered to a pH between 4 and 8 and containing 1–10 percent by volume of water-miscible organic solvent having a molecular weight greater than 50. The organic solvent avoids or greatly reduces a problem of initial prints being blemished by ink held on blank (background) areas of the printing forms. Especially effective solvents, such as propyl glycol, acetonyl acetone, diacetone alcohol, and N-methylpyrrolidone-2, having boiling points above 90° C. A high salt content in the developing solution inhibits any bleeding of the azo-dyestuff during development.

3,607,272

PHOTOGRAPHIC POLYMERIZATION PROCESS AND PRODUCT

John B. Rust, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 16, 1967, Ser. No. 616,587
Int. Cl. G03c 1/68
U.S. Cl. 96—35.1 20 Claims

Photopolymerizable monomer medium and method of light exposure to effect exposure and development by multiple stages of polymerization and desensitizing photopolymerization with different light intensities, and the products produced therewith and thereby.

3,607,273

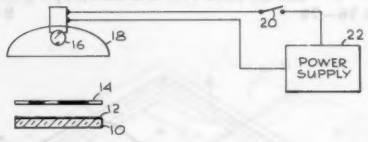
IMAGE FORMATION BY SELECTIVE FOAM GENERATION

Layton C. Kinney, Chicago, Ill., assignor to American Screen Process Equipment Company, Chicago, Ill.

Filed Mar. 8, 1967, Ser. No. 621,581
Int. Cl. G03c 5/00
U.S. Cl. 96—35 6 Claims

A substrate having a color such that it absorbs a substantial amount of the visible spectrum is covered over with a thin layer of material which foams or expands in response to heat.

An image-forming member such as a positive transparency is positioned over the foaming layer and a light source is flashed therethrough to the foaming layer. The foaming layer expands under the light-transmitting regions of the transparency and remains substantially unaffected over the other regions. Where the material is foamed, when light is applied it scatters the light. Where is is not foamed, it does not. Accordingly, an image is formed on the surface of the substrate by this technique.



3,607,274

METHOD FOR OBTAINING PRINTING MEDIA HAVING RELIEF EFFECT

Marcel Pelletier, and Irving V. Nissman, both of Brooklyn, N.Y., assignors to Marvic Advertising Corporation, Brooklyn, N.Y.

Filed Sept. 5, 1968, Ser. No. 757,691
Int. Cl. G03c *5/06*
U.S. Cl. 96—44 **2 Claims**

A method for obtaining printing media having relief effect including the removal of the background and the natural shadow of an object by exposing a film in succession to a screen positive and to a positive mask to obtain a screened negative of the object with its shadows and background removed. The positive mask is mechanically used with a negative mask to photographically obtain a screened negative shadow of the object. Then, another film is exposed to the screened negative and to the screened negative shadow of the object to form a screened positive of the object provided with an added shadow, wherein the background and original shadows have been removed to obtain the desired relief effect for the printed media.

3,607,275

DIAZO-TYPE MATERIAL

Oskar Sus, and Georg Werner, both of Wiesbaden-biebrich, Germany, assignors to Keuffel & Esser Company, Hoboken, N.J.

Filed Nov. 27, 1968, Ser. No. 779,639
Claims priority, application Germany, Nov. 29, 1967, P 15 97 629.1
Int. Cl. G03c *1/58, 1/60*
U.S. Cl. 96—49 **5 Claims**

Diazo-type images obtained from copying material comprising p-amino benzene diazonium compounds and 2,3-dihydroxypyridine are shifted from red to blue color shades by including a water-soluble zinc salt with the diazonium compound in a ratio of at least about 2 to 1.

3,607,276

PROCESS FOR MAKING METAL-GLOSSY IMAGES AND PROJECTION USING THE SAME

Shingo Ooue, Saitama; Hiroyuki Ueda, Saitama, and Yoshihide Hayakawa, Kanagawa, all of Japan, assignors to Fuji Photofilm Co., Ltd., Kanagawa, Japan

Filed Feb. 14, 1968, Ser. No. 705,457
Claims priority, application Japan, Feb. 14, 1967, 42/9420
Int. Cl. G03c *5/26, 5/24*
U.S. Cl. 96—50 **5 Claims**

A process for making a metal-glossy image which comprises treating a silver halide image with a solution containing physical developing nuclei and then treating the silver halide image thus treated with a solution containing a solvent for silver halide. A projection process which comprises treating a silver halide image with a solution containing a solvent for silver halide to provide a metal-glossy image, applying to the surface of the metal-glossy image an illuminating light beam for transmission and an illuminating light beam for reflection, combining the penetrating light beam and the reflected light beam, and projecting on a screen the combined light beam to provide a projected image having various contrasts.

3,607,277

PHOTOGRAPHIC VISCOUS PROCESSING

Karl-Wilhelm Schranz, Opladen, and Erwin Schon, Leverkusen, both of Germany, assignors to Afga-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 1, 1968, Ser. No. 764,305
Claims priority, application Germany, Oct. 14, 1967, P 15 97 489.7
Int. Cl. G03c *5/38*
U.S. Cl. 96—55 **4 Claims**

The processing of color photographic films is accelerated and viscous pastes are used for bleaching and fixing by color developing color-photographic images first coating a viscous fixing paste on the developed material and coating on thereafter a viscous bleaching paste. Thereafter the layers of the fixing and bleaching pastes are sprayed off with water and finally the color photographic material is rinsed in water.

3,607,278

PHOTOGRAPHIC ELEMENTS CONTAINING FOGGED AND UNFOGGED SILVER HALIDE GRAINS AND A SLOW SILVER HALIDE EMULSION LAYER

Joseph R. Ditzer, Jr., Kingsport, Tenn., and Fred W. Spangler, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 18, 1968, Ser. No. 722,223
Int. Cl. G03c *1/76, 3/00*
U.S. Cl. 96—67 **11 Claims**

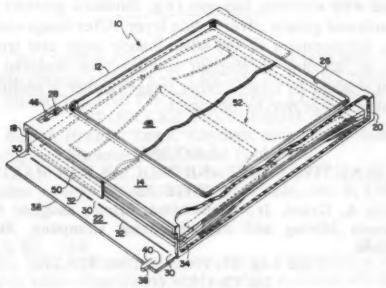
Improved photographic elements comprising fogged and unfogged silver halide grains and a slow speed sliver halide emulsion layer exhibiting improved antifoggant properties in developer solutions are disclosed.

3,607,279

PHOTOGRAPHIC FILM ASSEMBLAGE

Nicholas Gold, Arlington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 16, 1968, Ser. No. 784,159
Int. Cl. G03b *17/26;* **G03c** *3/00*
U.S. Cl. 96—76 **8 Claims**



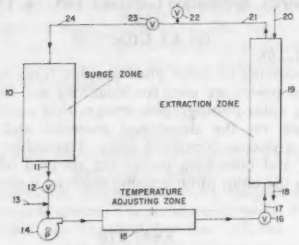
A photographic film assemblage including a container having a forward wall with a light-transmitting section therein and an end wall which cooperates with the forward wall to define a withdrawal opening. A plurality of film units are stacked within the container with their photosensitive surfaces facing the light-transmitting section and with one of their ends positioned adjacent the end wall. A dark slide, movable through the withdrawal opening and comprised of a rigid member and a flexible skirt, is provided to prevent the admission of actinic light through the light-transmitting section and the withdrawal opening, respectively.

3,607,280

SINGLE COLUMN CIRCULATORY COFFEE EXTRACTION PROCESS

Richard F. Durchholz, Loveland, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 1, 1969, Ser. No. 862,822
Int. Cl. A23f *1/08*
U.S. Cl. 99—71 **6 Claims**



A novel process for producing instant coffee extract utilizing apparatus which comprises a surge tank connected in a circulatory system with a single extraction column. Extract product is produced by manipulating the extract surge by circulating it through the extraction column and varying the extract and water temperatures previous to extraction and hydrolysis.

3,607,281

GELATIN RELIEF IMAGE

John Peter Stonham, Ilford, Essex, England, assignor to Ilford Limited, Ilford, Essex, England

Filed June 10, 1969, Ser. No. 832,020
Claims priority, application Great Britain, June 12, 1968, 27947/68
Int. Cl. G03c *5/00*
U.S. Cl. 96—36 **8 Claims**

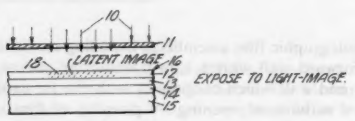
Photographic material comprising a support coated, in order, with a nonlight-sensitive gelatin layer partially cross-linked with disulfide linkages (e.g. thiolated gelatin) and an unhardened gelatin silver halide layer. After imagewise exposure, development of the silver halide layer and treatment with an alkaline mercaptan solution, the material is hot water-washed to form a relief image. Either a positive or a negative image may be obtained.

3,607,282

SENSITIVE SHEET AND PROCESS FOR MAKING POSITIVES

Edwin A. Grant, Jr., Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 31, 1966, Ser. No. 576,278
Int. Cl. G03c *1/76, 1/02*
U.S. Cl. 96—69 **7 Claims**



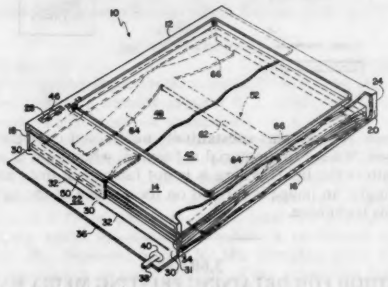
Sheet material having an upper heat-developable layer sensitive to visible light and a lower heat-developable layer sensitive to ultraviolet radiation forms a positive image of an original by a process involving only exposing and heating.

3,607,283

PHOTOGRAPHIC FILM ASSEMBLAGE

Nicholas Gold, Arlington, Mass., assignor to Polaroid, Cambridge, Mass.

Filed Dec. 16, 1968, Ser. No. 784,160
Int. Cl. G03b *17/26*; G03c *3/00*
U.S. Cl. 96—76 **8 Claims**



A photographic film assemblage including a container for holding film units, having a forward wall with a light-transmitting section therein and an end wall cooperating with the forward wall to define a withdrawal opening; a plurality of film units stacked within the container with one of the film units located in alignment with the withdrawal opening; and a stop in the form of an integral extension of the end wall extending part way across the withdrawal opening to prevent the movement of more than one film unit at a time from the container through the withdrawal opening.

3,607,284

RIGID FRAME SENSITIVE UNIT SUITABLE FOR EXPOSURE AND PROCESSING IN AN EXPOSING DEVICE

Donald M. Harvey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 4, 1968, Ser. No. 695,768
Int. Cl. G03c *5/54*
U.S. Cl. 96—76 **12 Claims**

A radiation-sensitive unit such as a slide transparency unit is provided with at least one rupturable pod formed adjacent to an edge of a rectangular supporting member having a central opening across which a radiation-sensitive element extends. The unit preferably is provided with two pods which are adapted to be ruptured sequentially by a first-and-second-piston mechanism within an exposing device in such a manner that processing agents contained in the pods are ejected sequentially into a space between the radiation-sensitive element and a strippable sheet so that development and fixing of the image can take place. The strippable sheet, at least a portion of the pods, and any unabsorbed processing agents are stripped from the unit after the unit has been processed and removed from the camera so that the unit will be ready for use.

3,607,285

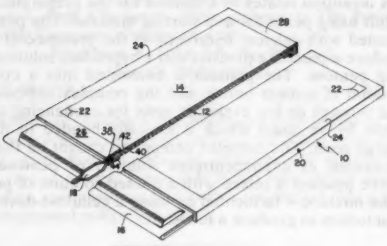
PHOTOGRAPHIC FILM UNIT

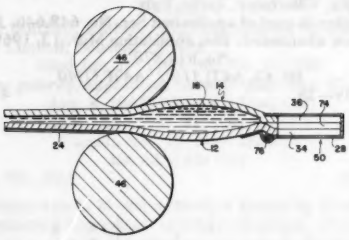
Richard J. Chen, Winchester, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 726,252, May 2, 1968, which is a continuation-in-part of application Ser. No. 721,231, Apr. 15, 1968, now abandoned. This application Aug. 28, 1968, Ser. No. 756,017
Int. Cl. G03c *1/48*
U.S. Cl. 96—76 **7 Claims**

A self-developing film unit including a photosensitive sheet and a transparent sheet bound at their margins in face-to-face relation and adapted to be processed to produce a visible image between the sheets by advancing the sheets between a pair of pressure-applying members to spread a

processing liquid between the sheets from a container one end thereof toward the other end of the film unit. Trapping means are provided at the other end of the film unit for collecting and retaining excess processing liquid. The film unit is adapted to be retained intact following spreading of the processing liquid and includes trapping means providing a





trapping space bounded by the sheets at the other end of the film unit and means for securely laminating the sheets to one another intermediate the area of the film unit containing the image and the trapping space to prevent flowback and/or migration of excess processing liquid from the trapping space into the adjacent image-containing area.

3,607,286

PHOTOGRAPHIC MATERIAL COMPRISING AN ANTI-STATIC COATING

Henry Walter Wood, Ilford, England, assignor to Ilford Limited, Ilford, England

Filed July 1, 1969, Ser. No. 838,350

Claims priority, application Great Britain, July 3, 1968, 31,705/68

Int. Cl. G03c *1/82*

U.S. Cl. 96—87 A **8 Claims**

This application describes photographic material which comprises a support base having coated thereon on one or both sides at least one photographic emulsion layer, and having coated on each topmost emulsion layer a gelatin supercoat layer, there being present on at least one supercoat layer an antistatic layer which is a layer of a homopolymer of a compound of general formula I:

$$(CH_2{=}CH{-}CH_2)_2NR_1R_2{\cdot}X^- \quad \text{I}$$

where R_1 and R_2 are each hydrogen atoms or alkyl groups and X is an anion, or a copolymer thereof with minor amounts of other ethylenically unsaturated monomers, the said homo- or copolymer layer having been coated from a lower primary alcohol solution, or photographic material which comprises a support base which has on one side thereof at least one photographic emulsion layer and which has on the other side an antistatic layer which is a layer of a homopolymer of a compound of the above formula I or a copolymer thereof with minor amounts of other ethylenically unsaturated monomers.

3,607,287

NEGATIVE-WORKING TWO-COMPONENT DIAZOSULFONATE MATERIAL

Dieter Bohm, Niederwalluf/Rheingau, Germany, assignor to Keuffel & Esser Company, Morristown, N.J.

Filed Dec. 29, 1969, Ser. No. 888,837

Claims priority, application Germany, Dec. 30, 1968, P 18 17 417.9

Int. Cl. G03c *1/56, 1/60*

U.S. Cl. 96—91 R **3 Claims**

The storage stability and useful life of negative-working two-component diazo-type material is extended by including a polyether of a dihydric aliphatic alcohol in the light-sensitive composition with a light-sensitive diazosulphonate and an azo coupler component.

3,607,288

RADIATION-SENSITIVE SILVER HALIDE EMULSIONS CONTAINING AMINE BORANES AND GOLD COMPOUNDS

Cortland R. Burt, Rochester, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 12, 1968, Ser. No. 736,276

Int. Cl. G03c *1/36*

U.S. Cl. 96—101 **11 Claims**

In direct positive emulsions chemically fogged with amine boranes, the tendency for red light to bleach the image because of red light sensitivity is reduced by digesting the molten emulsion in the presence of a water-soluble gold compound. The gold compound is added in an amount from 0.400×10^{1} to 3.40×10^{15} moles of Au^{++++} per 1.5 moles of silver nitrate. The gold compound may be added before or after the addition of the amine borane fogging agent.

3,607,289

GELATIN EMULSIONS HAVING IMPROVED PROPERTIES

Wolfgang Keberle; Wolfgang Himmelmann; Fritz Nittel, and Gunter Oertel, all of Leverkusen, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 23, 1967, Ser. No. 662,582

Int. Cl. G03c *1/04*

U.S. Cl. 96—114 **2 Claims**

Photosensitive photographic material having at least one gelatin-containing emulsion comprising an anionic polyurethane in which the salt-forming groups are phosponic acid, phosphoric ester or phosphoric acid amide groups, or their salts.

3,607,290

POLYMER-CONTAINING SILVER HALIDE PHOTOGRAPHIC EMULSIONS, PREPARATION THEREOF AND PHOTOGRAPHIC ELEMENTS PRODUCED THEREFROM

Louis Butler, Harlow, Essex, England, assignor to Minnesota Mining and Manufacturing, Saint Paul, Minn.

Filed Jan. 3, 1969, Ser. No. 788,937

Claims priority, application Great Britain, Jan. 8, 1968, 1147/68

Int. Cl. G03c *1/72*

U.S. Cl. 96—114 **17 Claims**

Silver halide photographic emulsions containing a water-insoluble latex of an alkoxyalkyl acrylate polymer are shown, together with a process for preparing such emulsions and photographic elements produced therefrom.

3,607,291

DIMETHYLAMINE OXIDES AS COATING AIDS FOR PHOTOGRAPHIC ELEMENTS

William J. Knox, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 8, 1968, Ser. No. 719,672

Int. Cl. G03c *1/38*

U.S. Cl. 96—114.5 **17 Claims**

Alkyldimethylamine oxides, e.g. lauryl-, cetyl-, myristyl-, and the like-, dimethylamine oxides are found to be particularly suitable for use as coating aids for gelatin-containing layers of photographic papers, films, plates, and the like.

These coating aids are more especially suitable in multiple-layer coating techniques in making such elements.

3,607,292

TRIACRYLYLDIETHYLENETRIAMINE, METHOD OF PRODUCING THE SAME, AND PHOTOPOLYMERIZATION PROCESS AND SYSTEM UTILIZING THE SAME

Edward J. Cerwonka, Binghamton, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed July 28, 1969, Ser. No. 845,519
Int. Cl. G03c *5/00, 1/68*
U.S. Cl. 96—115 P 9 Claims

A new monomer triacrylyldiethylenetriamine is prepared by the reaction of diethylenetriamine acryloyl chloride and sodium hydroxide, the reaction yielding the desired monomer, sodium chloride and water. The monomer, triacrylyldiethylenetriamine, is useful in the photopolymerization process as high-speed polymerizable monomer in conjunction with a colloidal carrier and a light-sensitive ferric salt. Modification of the reactants in the above process allow for the production of polyacrylyl and polymethacrylyl polyethylene polyamines containing 2 to 4 ethylene groups.

3,607,293

METHOD FOR TREATING MICRO ORGANISM CELLS

Tadayasu Furukawa, Machida-shi, and Hideyuki Furukawa, Tokyo, both of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed May 12, 1969, Ser. No. 823,613
Claims priority, application Japan, May 15, 1968, 43/32197
Int. Cl. A23l *1/00*
U.S. Cl. 99—1 18 Claims

A method for treating micro-organism cells or protein extracted therefrom in order to bleach and improve the digestion rate thereof which comprises treating the cells or extracted protein with hydrogen peroxide. Advantageously, an aqueous solution or suspension of the cells or protein is prepared, the pH is adjusted to 3–12 and about 0.1 to 10 percent by weight of hydrogen peroxide is added thereto, the temperature of the mixture being maintained at 0°–100° C.

3,607,294

CHEESE COMPOSITION USEFUL AS A FISH BAIT

Carl Anthon Ernstrom, Logan, Utah, assignor to Nelson-Ricks Creamery Company, Salt Lake City, Utah

Filed Apr. 25, 1968, Ser. No. 724,236
Int. Cl. A01k *85/00*
U.S. Cl. 99—3 6 Claims

A cheese composition suitable for use as a fish bait is produced by techniques similar to those employed for the production of processed or blended cheese spreads. The cheese composition includes ingredients suitable for use in processed or blended cheese spreads but differs from such spreads by the inclusion of a high percentage of nonfat milk solids. The formulation is adjusted to maximize water content and minimize fat content thereby producing a fish bait composition of stiff consistency which can be molded over a fishhook and which will remain in place when it is moved through the water.

3,607,295

PLASTIC MOLDABLE COMPOSITION USEFUL AS A FISH BAIT

Dee R. Morgan, 1994 North 800 East, Logan, Utah

Filed Oct. 18, 1968, Ser. No. 768,929
Int. Cl. A01k *85/00*
U.S. Cl. 99—3 7 Claims

A composition for use as a fish bait is produced by blending fat characterized by an overall melting point above about 90° F. and a solid fat index above about 25 at 70° F. with appropriate quantities of water, casein (or caseinates), filler, and emulsifying agents to produce a moldable, semisolid, plastic material which retains its adhesive properties even after prolonged use in contact with water.

3,607,296

METHOD FOR THE PREPARATION OF A FEEDSTUFF BY USING PEATMOSS AS A STARTING MATERIAL

Ryonosuke Abbe, Yokohama, Japan, assignor to Tempoku Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 5, 1968, Ser. No. 773,672
Int. Cl. A23k *1/14*
U.S. Cl. 99—9 2 Claims

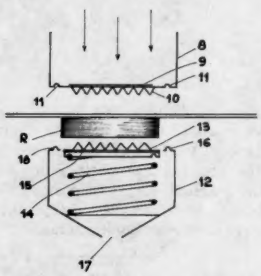
This invention relates to a method for the preparation of a feedstuff using peatmoss as a starting material. The peatmoss is digested with calcium hydroxide in the presence of water to produce a pastelike product and a byproduct solution containing pentose. The pentose is converted into a complex compound of sodium borate and the complex compound is passed through an ion exchange resin for exchanging a complex ion by an anion which is ionically bonded to the ion exchange resin. The complex compound caught on the resin is recovered as a concentrated solution of pentose. The pastelike product is mixed with a diluted solution of pentose and the mixture is fermented by using a cellulose-decomposing bacterium to produce a feedstuff.

3,607,297

METHOD FOR PRODUCING BEVERAGES

Osvaldo Fasano, Strada Viciniale Prato del Lupo Frazione Corbiglia, Villarbasse, Turin, Italy

Continuation-in-part of application Ser. No. 648,646, Jan. 26, 1967, now abandoned. This application Mar. 13, 1969, Ser. No. 814,878
Int. Cl. A47j *31/02*; A47f *31/40*
U.S. Cl. 99—28 4 Claims



A relatively large quantity of a liquid is passed through a relatively small quantity of beverage-producing substance disposed in a pocket between two foils. Two conduits grasp the foils between them in endwise abutting sealed relationship, with the pocket within the conduits. One foil is weaker than the other, so as to be ruptured by the pressure of the liquid.

3,607,298

HOP CONCENTRATES

William Mitchell, Hatfield, England, and Robert O. V. Lloyd, Sandyford, Ireland, assignors to Bush Boake Allen Limited, London, England

Continuation-in-part of application Ser. No. 359,788, Aug. 14, 1964, now abandoned. This application Apr. 11, 1967, Ser. No. 629,905
Int. Cl. C12c *9/02*
U.S. Cl. 99—50.5 33 Claims

Hop extract free of fixed hop seed oil is prepared by treating hop and hop extracts with ethanol or methanol and 5–20 percent water. The hop extract may be isomerized. A brewing adjunct containing substantially no fixed hop seed oil and containing humulones or isohumulones emulsifying agents stabilizers and sugars is disclosed.

ERRATUM

For Class 99—71 see:
Patent No. 3,607,280

3,607,299
METHOD OF MAKING A DISPOSABLE POUCHED COFFEE PRODUCT

Gregory L. Bolt, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 4, 1969, Ser. No. 855,364
Int. Cl. B65b *29/02*
U.S. Cl. 99—77.1 **8 Claims**

A method of making a disposable pouched coffee product comprising compressing roast and ground coffee to provide a loosely agglomerated coffee ring, encasing said agglomerated coffee ring in a water-permeable fabric filter pouch and disintegrating said agglomerated coffee ring to provide particulate compressed coffee in a pouch.

3,607,300
PREPARATION OF ISOHUMULONE CONTAINING HOP EXTRACT

William Mitchell, Hatfield, England, assignor to Bush Boake Allen Limited, London, England

Filed July 10, 1968, Ser. No. 743,586
Claims priority, application Great Britain, Nov. 17, 1965, Aug. 8, 1967, 48866/65;36469/67
South Africa Nov. 11, 1966, 66/6829;
Canada Nov. 13, 1967, 004,813
Int. Cl. C12c *9/02*
U.S. Cl. 99—50.5 **11 Claims**

An improvement in the method of preparing an isohumulone containing hop extract in which a solution of an extract of hops in a water immiscible solvent which dissolves alkali metal humulate salts less readily than does a dilute aqueous alkali metal carbonate, is contacted with such a carbonate to transfer the humulate salts into the aqueous phase and leave the lupulones in the organic phase. The improvement comprises separating the humulate salts from the aqueous phase by (i) precipitating the salts or (ii) extracting them from the aqueous phase with a water-immiscible polar solvent. The humulate salts are then isomerized by heating. The invention also includes a method for flavoring beer by adding a novel aqueous solution of potassium isohumulates which is substantially free from lupulones and fixed and essential oils of hops, to fermented beer.

3,607,301
PRODUCTION OF WHIPPABLE CREAM

Arthur Bratland, Maudsvei 9, Heie, Notteroy, Norway

Filed Oct. 1, 1968, Ser. No. 764,345
Int. Cl. A23c *13/00, 13/12*
U.S. Cl. 99—60 **12 Claims**

A process for producing whipping cream having a fat content not greater than of the order of 25 percent by weight involving the step of expelling and separating pure butter oil from a milk product having above 15 percent by weight of milk fat and adding the remainder to a cream to constitute said whipping cream.

3,607,302
COFFEE BAG

Russell C. Beck, 617 Cityview Ave., Avalon, Pa.

Filed Dec. 16, 1969, Ser. No. 885,565
Int. Cl. A23f *1/00*
U.S. Cl. 99—77.1 **2 Claims**

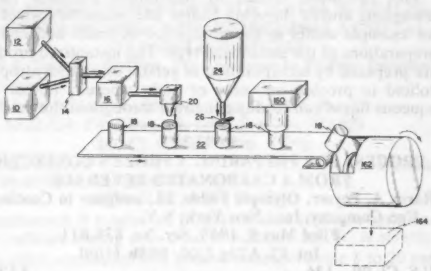
A coffee bag for brewing an individual cup of coffee, the device comprising a tea baglike assembly, consisting of a porous paper envelop containing a premeasured amount of ground coffee beans, and the envelop being attached to one

end of a string for conveniently dipping into a cup of boiling hot water.

3,607,303
BEVERAGE CARBONATION METHODS AND APPARATUS

Joseph P. Bingham, Salt Lake City, Utah, assignor to Lynn G. Foster, Salt Lake City, Utah, a part interest

Filed Feb. 26, 1968, Ser. No. 708,062
Int. Cl. A23l *1/00;* **B65b** *63/08*
U.S. Cl. 99—79 **13 Claims**



Precooled uncarbonated beverage is filled into an open topped container. A slug of solid carbon dioxide is deposited into the container while the beverage temperature is still near its freezing point causing the solid carbon dioxide to be encapsulated by a film of ice formed by the beverage. The film acts to control the rate of sublimation of the solid carbon dioxide. The containers are sealed and agitated. Means are also disclosed to provide the sized slugs of solid carbon dioxide.

3,607,304
STABLE DRIED DEFATTED EGG PRODUCT

Ezra Levin, 1109 W. University Ave., Champaign, Ill.

Filed Feb. 1, 1968, Ser. No. 702,174
Int. Cl. A23j *1/08;* **A23b** *5/02*
U.S. Cl. 99—113 **5 Claims**

A stable, dried and defatted egg product which has the improved features of being free of Salmonella infection substantially free of any fat so as to have indefinite shelf life without spoilage. The product has higher protein content and may contain a small amount of an antioxidant in intimate dispersion characterized by a tendency to contact or adhere to the individual particles of the product so as to exert an improved effect. The product is made by removing water and the fat in a body of solvent at moderate temperatures below levels which would tend to cook the raw egg. The water is removed as an azeotropic mixture of solvent and water, and the fat is

extracted into the solvent. The solid product is separated from the mixture of solvent and extracted fat, and the remaining solvent is preferably removed by introducing a body of water in the form of particulate droplets while maintaining a moderate temperature level.

3,607,305
COOL TASTING MARGARINE
Herbert Willem Lincklaen Westenberg, Vlaardingen, Netherlands, assignor to Lever Brothers Company, New York, N.Y.
Filed Dec. 29, 1967, Ser. No. 694,356
Claims priority, application Great Britain, Dec. 30, 1966, 58379/66
Int. Cl. A23d *3/02*
U.S. Cl. 99—122 R **9 Claims**

A liquid fat with low saturated fatty acid content is hydrogenated to a slip melting point of 30–40 °C while substantially increasing its trans acid content and providing a dilatation curve of specified steepness and is used in blends with liquid oils for the manufacture of cool-tasting margarine with little or no added lauric acid fats. The liquid and/or hydrogenated components of the blends may be interesterified and both may be derived from the same source, e.g. sunflower, safflower or rapeseed oil.

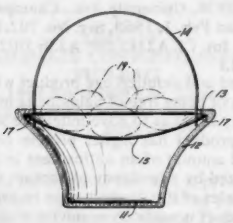
3,607,306
INSTANTIZED PRODUCTS
Thomas F. McMichael, Edinburgh, Scotland, assignor to Cerebos Foods Limited, London, England
Filed Feb. 19, 1968, Ser. No. 706,622
Claims priority, application Great Britain, May 17, 1967, 22845/67
Int. Cl. A23l *1/34*
U.S. Cl. 99—124 **8 Claims**

This invention relates to instantized products having thickening and/or flavoring and/or like properties which are for example useful in the production of foods and culinary preparations of the instantized type. The instantized products are prepared by incorporation of gelatin or other hydrophilic colloid to provide networks or paths whereby hot or cold aqueous liquid can readily penetrate throughout the product.

3,607,307
PROCESS FOR PREPARING A FROZEN CONFECTION FROM A CARBONATED BEVERAGE
Harry A. Peyser, Olympia Fields, Ill., assignor to Continental Can Company, Inc., New York, N.Y.
Filed May 9, 1969, Ser. No. 831,811
Int. Cl. A23g *5/00;* **B65b** *31/00*
U.S. Cl. 99—136 **3 Claims**

A packaged carbonated beverage which can be frozen to a flavored solid crystalline confection having a snowlike physical appearance, comprising a flavored carbonated beverage packaged in a suitable container having incorporated therein a fluorinated hydrocarbon.

3,607,308
CANDY NOVELTY
Paul H. Dubble, Reading, Pa., assignor to Court Candies, Inc., Reading, Pa.
Filed Feb. 28, 1969, Ser. No. 803,145
Int. Cl. A23g *1/22, 1/20*
U.S. Cl. 99—138 R **2 Claims**



A hollow container formed of edible chocolate and having an upwardly presented opening adapted to receive articles to be carried in the container. The container has an inturned lip around the opening and is provided with a means for carrying the container including an elongated strip type handle and a handle-anchoring member formed of sheet material and having an edge thereof engaged under the lip formed around the container opening.

3,607,309
PREPARATION OF MARSHMALLOW WITH MILK SOLIDS
Edward S. Olney, and Howard S. Thurmon, both of Deerfield, Ill., assignors to Kraftco Corporation, New York, N.Y.
Filed Nov. 1, 1968, Ser. No. 772,806
Int. Cl. A23g *3/00*
U.S. Cl. 99—134 A **5 Claims**

A marshmallow confection containing milk solids and a method for making same are provided. In one process for making the marshmallow confection a syrup is prepared from a mono-saccharide sugar, a di-saccharide sugar and water by heating a mixture of these ingredients with agitation. The syrup mixture is thereafter cooled to a temperature less than the caramelization of milk solids, and a concentrated dispersion of milk solids is added thereto. A dispersion of a colloid, such as gelatin, is then added and the mixture is pumped through a beater so as to aerate the mixture. The mixture is then cooled and formed into pieces of desired shape and size.

3,607,310
PRODUCTION OF FORTIFIED SUGAR
James F. Carter, Jr., 19005 Bryant St., Northridge, Calif.
Filed July 29, 1966, Ser. No. 568,989
Int. Cl. A23l *1/26*
U.S. Cl. 99—141 **9 Claims**

Producing fortified beet cane or corn sugar identical in appearance to the unfortified sugar product by mixing a combination of coated nutrients, unfortified sugar and a masking agent, the mixing accompanied by a minimum of breaking of the nutrient coating.

3,607,311
OBTULINUM EXOTOXIN INHIBITED FOODS
Gerhard Julius Hass, 28 Arcadia Road, Woodcliff Lake, N.J., and Nino Insalata, 223 Martha Drive, Battle Creek, Mich.
Filed Feb. 16, 1968, Ser. No. 705,898
Int. Cl. A23b *1/00, 3/00*
U.S. Cl. 99—154 **2 Claims**

Food spoilage caused by the action of Clostridium botulinum is inhibited by adding small amounts of everninomicin to the food.

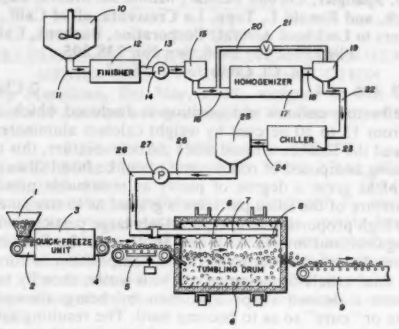
3,607,312
METHOD OF PREPARING AND PRESERVING READY-TO-EAT FOODS
Charles Ambrosia Ready, Fountain Inn, S.C., assignor to W. R. Grace & Co., Duncan, S.C.
Filed Apr. 1, 1969, Ser. No. 812,381
Int. Cl. A23l *3/00;* **B65b** *5/00*
U.S. Cl. 99—165 **4 Claims**

A method of preparing and preserving ready-to-eat food comprising vacuum packaging the food in a gas tight pouch, cooking the food in the pouch by immersing in hot water, rapidly chilling the food to about 30° F. but not freezing, storing at 30° F. until needed for consumption, and heating in hot water to serving temperature. A food package substantially free of pathogens results from the method.

3,607,313
METHOD OF APPLYING AN EDIBLE COATING TO INDIVIDUALLY QUICK-FROZEN FOOD PIECES BY FREEZE ADHERENCE
Theodore L. Roth, Stockton, Calif., assignor to Freezecoat Incorporated, Stockton, Calif.
Filed Oct. 14, 1968, Ser. No. 767,085
Int. Cl. A23b *7/04, 7/16*
U.S. Cl. 99—166 **1 Claim**

Individual food pieces are quick-frozen and transfered to a zone where they are subjected to turbulence while being

sprayed with sauce. The quantity of sauce sprayed is proportioned by the quantity of food entering the zone. The sauce is



prepared by mixing various ingredients, homogenizing a portion, and chilling the combined sauce so that it freeze adheres to the food pieces when sprayed.

3,607,314

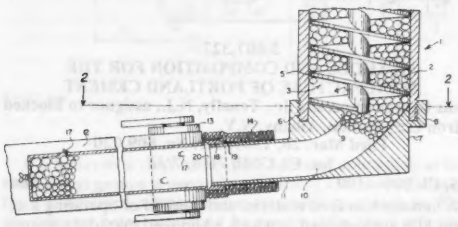
METHOD OF PROCESSING BONELESS MEAT PIECES FOR SUBSEQUENT GRINDING

Robert C. Lugiewicz, Pittsburgh, Pa., assignor to Cubb-Pac Corporation, Pittsburgh, Pa.

Continuation-in-part of application Ser. No. 526,412, Feb. 10, 1966, now Patent No. 3,414,936. This application Oct. 3, 1968, Ser. No. 764,725

Int. Cl. A22c *18/00*; **A23b** *1/00*

U.S. Cl. 99—194 **8 Claims**



Discrete pieces of meat are introduced to a housing having a screw conveyor therein which compacts the meat pieces into a solid bar that is fed to and through a horn which communicates with the housing tangentially and laterally of the axis of the housing. The bar is extruded from the horn into a casing formed of an elastic, flexible material which has spaced openings therein and which is withdrawn from the horn by the bar as the latter is extruded. At the discharge end of the horn the casing is stretched radially and the meat bar expands radially. The expansion of the meat bar and the elasticity of the casing cooperate to fit the casing so tightly about the bar that those portions of the bar opposite the openings in the casing protrude therethrough. The bar is cut into substantially uniform lengths which are frozen for shipment to meat markets for subsequent grinding of the meat.

3,607,315

METHOD OF MAKING FROZEN PATTIES

Anthony S. Partyka, Chicago, Ill., assignor to Kraftco Corporation, New York, N.Y.

Filed Apr. 10, 1968, Ser. No. 720,394

Int. Cl. A23b *3/06*; **A23l** *1/33*

U.S. Cl. 99—195 **4 Claims**

A method for preparing portion controlled patties from fish, particularly shellfish. In the method frozen shellfish are comminuted while frozen to a desired particle size. The frozen particles are mixed with suitable flavoring materials to provide a mix and the mix is then molded into portion controlled patties while the temperature of the mix is maintained below freezing.

3,607,316

PROCESS OF PRODUCING LARGE DEHYDRATED ONION PIECES

Jaquelin H. Hume, 120 Montgomery St., San Francisco, Calif.

Filed Dec. 8, 1966, Ser. No. 601,293

Int. Cl. A23b *7/02*

U.S. Cl. 99—204 **7 Claims**

Producing large dehydrated onion pieces by submerging large cut onion pieces in a liquid, repeatedly drawing a vacuum over the liquid in order to remove at least one epidermol membrane and subsequently drying.

3,607,317

DUCTILITY PROMOTER AND STABILIZER FOR ELECTROLESS COPPER PLATING BATHS

Fredrick W. Schneble, Jr., Oyster Bay, N.Y., assignor to Photocircuits Corporation, Glen Cove, N.Y.

Filed Feb. 4, 1969, Ser. No. 796,542

Int. Cl. C23c *3/02*

U.S. Cl. 106—1 **13 Claims**

The present invention provides a means for controlling the stability of electroless copper plating baths and enhancing the ductility properties of the electroless metal deposits produced therefrom.

3,607,318

POLISHING COMPOSITION FOR METAL SURFACES COMPRISING MERCAPTO THIOETHERS AS METAL TARNISH INHIBITORS

Paul F. Warner, Phillips, Tex., assignor to Phillips Petroleum Company

Division of Ser. No. 658,044, Aug. 3, 1967, Pat. No. 3,522,314. Filed Dec. 10, 1969, Ser. No. 884,027

Int. Cl. C08h ; C09d ; C09g

U.S. Cl. 106—3 **6 Claims**

The compound represented by

$$HS-R-O-R-S-R'$$

wherein each R is selected from saturated aliphatic hydrocarbon radicals having 1 to 5 carbon atoms and R′ is selected from alkyl, cycloalkyl and alkaryl radicals having 8 to 20 carbon atoms, is prepared by the reaction of a dimercaptan with a monoolefin. The compounds have utility with paints, sealing compounds and silver or copper polish compositions. A preferred compound, 3-mercaptopropyl 3-(*t*-dodecylthio)propyl ether, is a very effective tarnish inhibitor for silver.

3,607,319

PROCESS FOR MAKING REFRACTORY MOLDS

Robert K. Scott, Pittsburgh, Pa., assignor to Avnet, Inc., Plainview, Long Island, N.Y.

Filed Mar. 5, 1969, Ser. No. 804,649

Int. Cl. B28b *7/34*

U.S. Cl. 106—38.35 **8 Claims**

A refractory mold is prepared from a prehydrolyzed organic silicate and a particulate refractory material having a coating prepared from an air-stable organic base, water and a water-soluble polyhydric alcohol or an ester thereof.

3,607,320

PHOTOTROPIC GLASS-CERAMIC ARTICLES CONTAINING BISMUTH DOPED CALCIUM TUNGSTATE CRYSTALS

Sumio Sakka, Troy, N.Y., assignor to Pittsburgh Plate Glass Company, Pittsburgh, Pa.

Filed Apr. 1, 1968, Ser. No. 717,527

Int. Cl. C03c *3/22, 3/26, 3/14*

U.S. Cl. 106—39 DV **5 Claims**

The instant invention relates to new glass-ceramic articles containing alkaline earth tungstate crystals. More particu-

larly, the invention pertains to a phototropic article comprising a glassy matrix containing an alkaline earth tungstate doped with bismuth. The invention especially pertains to glassy matrices of boric oxide or silica.

3,607,321

GLASS MATERIALS FOR SILVER-ACTIVATED PHOSPHATE GLASS DOSIMETER

Hyosuke Yokota, Yokohama-shi, and Saburo Nakajima, Kawasaki-shi, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed May 4, 1966, Ser. No. 547,574

Claims priority, application Japan, May 12, 1965, May 14, 1965, 40/27328;40/27964

Int. Cl. C03c *3/16, 3/24*

U.S. Cl. 106—47 **6 Claims**

A dosimeter glass material exhibiting good durability against weathering, good workability, high sensitivity, low predose and low fading characteristics is comprised of from 40 to 55 parts by weight of lithium metaphosphate and complementarily, from 60 to 45 parts by weight of aluminum metaphosphate and from 2 to 11% of silver metaphosphate based on the combined weight of said lithium and aluminum metaphosphates.

3,607,322

LIGHT TRANSMITTING GLASS FIBERS, CORE AND CLADDING GLASS COMPOSITIONS

William C. Brady, Granville; Ralph L. Tiede, Granville; Folsom M. Veazie, Granville, and Warren W. Wolf, Columbus, all of Ohio, assignors to Owens-Corning Fiberglas Corporation

Filed May 22, 1969, Ser. No. 827,056

Int. Cl. C03c *13/00, 3/10*

U.S. Cl. 106—54 **22 Claims**

Glass compositions are disclosed for use in producing light transmitting glass fibers composed of a central core glass surrounded by an outer cladding glass. The core glasses have the following range of proportions (by weight): SiO_2, 23–41%; Al_2O_3, 7–10%; B_2O_3, 2.5–11%; K_2O, up to 10%; BaO, 34–59%; Sb_2O_3, up to 0.05%, preferably 0.01 to 0.05%. The cladding glasses have the following range of proportions (by weight): SiO_2, 61–65%; Al_2O_3, 4–6%; CaO, up to 3%; MgO, 0.90–4%; B_2O_3, 12–16%; Na_2O, 7–12%; Li_2O, up to 4%; F_2, up to 3%; SeO_2 up to 0.004%, preferably 0.002 to 0.004%.

3,607,323

SINTERED STABILIZED ZIRCONIA CONTAINING DISCONTINUOUS PHASE OF COBALT-CONTAINING OXIDE

Craig S. Tedmon, Jr., Scotia, and Stephan P. Mitoff, Elnora, both of N.Y., assignors to General Electric Company

Filed July 31, 1968, Ser. No. 749,070

Int. Cl. C04b *35/48*

U.S. Cl. 106—57 **4 Claims**

The resistance of a zirconia mass or layer to gas penetration is maximized by sintering the zirconia body with a cobalt-containing sintering agent present therein as a separate phase. In the case of stabilized zirconia the cobalt-containing sintering agent may be introduced either during or after stabilization.

3,607,324

METHOD OF MAKING DENSE MAGNESIA-MAGNESIUM CHROMITE SPINEL BODIES

Peter E. D. Morgan, Cherry Hill, N.J., assignor to General Refractories Company, Philadelphia, Pa.

Filed Oct. 18, 1968, Ser. No. 768,918

Int. Cl. C04b *35/42;*

U.S. Cl. 106—59 **16 Claims**

Magnesium chromate is heated to thermally decompose the same while held in a confined zone under applied pressure whereby marked densification of the decomposing material occurs to produce dense magnesia/magnesium chromite spinel.

3,607,325

REFRACTORY-CERAMIC COMPOSITION AND METHOD

Earl G. Spangler, Corona Delmar; Milton M. Moore, Laguna Beach, and Ronald L. Topp, La Crescenta, all of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed June 19, 1968, Ser. No. 738,205

Int. Cl. C04b *35/02, 35/14*

U.S. Cl. 106—64 **7 Claims**

A refractory-ceramic composition is disclosed which contains from 15 to 30 percent by weight calcium aluminate cement and the balance a fused silica particle mixture, this mixture being composed of rodlike and platelike fused silica particles of as great a degree of purity as reasonable possible. The mixture of the silica particles is graded as to size so as to have a high proportion of comparatively large particles which abut against and interfit with one another in the final composition. Such a refractory-ceramic composition is formed into a final article by being mixed with water, then by being cast into a desired shape and then by being allowed to hydrate or "cure" so as to become hard. The resulting article is preferably air dried and then gradually heated to a temperature slightly above the temperature at which it will be used.

3,607,326

MINERAL GRINDING AIDS

Frank G. Serafin, 31 Livingston Drive, Peabody, Mass.

Continuation-in-part of application Ser. No. 556,589, June 10, 1966, now abandoned. This application Dec. 16, 1969, Ser. No. 885,640

Int. Cl. C04b *7/54*

U.S. Cl. 106—90 **16 Claims**

Solid inorganic compounds such as naturally occuring inorganic mineral compounds and Portland cement are interground with certain amine salts of aryl hydroxy compounds (e.g. triethanolamine phenoxide) to enhance the efficiency of the grinding operation.

3,607,327

METHODS AND COMPOSITION FOR THE MANUFACTURE OF PORTLAND CEMENT

Louis George Imperato, Jr., Tenafly, N.J., assignor to Blocked Iron Corporation, Albany, N.Y.

Filed Mar. 20, 1969, Ser. No. 809,020

Int. Cl. C04b *7/48, 7/38*

U.S. Cl. 106—100 **6 Claims**

A cement kiln feed material and method of operating a cement kiln are provided in which a kiln feed material comprising about 80–85 percent limestone, 10–14 percent of shale, clay or bentonite, 5 to 8 percent carbonaceous material and a member from the group consisting of oxides and hydroxides of alkaline earth metals are mixed with sufficient water to form lumps, dried to a moisture level below about 10 percent and reacted with carbon dioxide to form alkaline earth carbonates in situ and feeding the formed lumps into a kiln at high temperature and reacting the same to form a cement clinker.

3,607,328

PRODUCTION OF DELUSTERED CELLULOSIC SAUSAGE CASINGS

Henry J. Rose, and Albin F. Turbak, both of Danville, Ill., assignors to Tee-Pak, Inc., Chicago, Ill.

Continuation-in-part of application Ser. No. 431,181, Feb. 8, 1965, now abandoned. This application Sept. 30, 1968, Ser. No. 763,942

Int. Cl. C08b *21/20*

U.S. Cl. 106—166 **9 Claims**

Tubular regenerated cellulose films suitable for use as sausage casings are prepared in a highly delustered form by incorporating a mixture of two or more delustering agents having a refractive index substantially different from each other and from regenerated cellulose in a viscose solution prior to extrusion. The mixture of delustering materials is added to the viscose in solution in an inert cosolvent which is soluble in the viscose solution. The addition of the solution of

mixed delustering materials produces a delusterant fog upon extrusion of the viscose and formation of a regenerated cellulose film or tube therefrom.

3,607,329

CELLULOSE ACETATE BUTYRATE SEMIPERMEABLE MEMBRANES AND THEIR PRODUCTION

Serop Manjikian, Del Mar, Calif., assignor to The United States of America as represented by the Secretary of the Interior

Filed Apr. 22, 1969, Ser. No. 818,397
Int. Cl. B29d *27/04;* **C08b** *21/06, 27/42, 27/44, 27/58*
U.S. Cl. 106—177 **10 Claims**

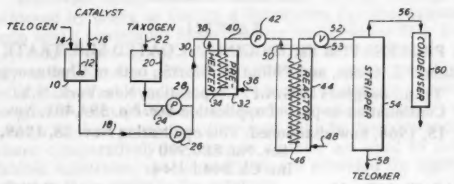
Semipermeable membranes are produced by casting a solution consisting essentially of cellulose acetate butyrate, triethyl phosphate, a flux promoter and an organic solvent into a film, and subsequently gelling the film by immersion in water. The membranes of the invention find particular utility in separation of solutes from solutions by osmosis or reverse osmosis.

3,607,330

TELOMER AND PLASTICIZED COMPOSITION FORMED THEREFROM

Charles E. Blades, Spring Row, N.J., assignor to Air Reduction Company, Incorporated, New York, N.Y.

Filed Dec. 29, 1967, Ser. No. 694,574
Int. Cl. C08b *27/44*
U.S. Cl. 106—178 **7 Claims**



A telomer of a vinyl ester and a benzene containing at least two methyl groups is used as a plasticizer for nitrocellulose to form plasticized nitrocellulose compositions, such as films, the telomer being produced by reacting the vinyl ester with the substituted benzene in the presence of a free radical catalyst.

3,607,331

CLAY-STARCH PAPER COATING COMPOSITIONS

Greene W. Strother, and William P. Coker, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 3, 1968, Ser. No. 733,809
Int. Cl. C08b *25/02*
U.S. Cl. 106—214 **9 Claims**

Clay-starch coating compositions have increased adhesion to paper when mixed with a small amount of a copolymer of a polyalkylenimine and an epihalohydrin. The copolymer insolubilizes the starch binder and thus increases its effectiveness in water resistant applications.

3,607,332

MODELING COMPOSITION

Harold T. Wingfield, Birchwood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 20, 1968, Ser. No. 714,459
Int. Cl. C08h *9/00*
U.S. Cl. 106—243 **7 Claims**

Thermoplastic modeling compositions which are resistant to cracking on standing after they have been molded. Preferably lightweight, they are relatively soft and easily molded at elevated temperatures and are slump or distortion-resistant but still pliable and finger-pressure deformable at room temperature. Distributed throughout the modeling compositions are rigid, regularly shaped microparticles, e.g., in the form of spheres or platelets.

3,607,333

DEVELOPERS FOR INSPECTION PENETRANTS EMPLOYING FUSIBLE WAXES

James R. Alburger, 5007 Hillard Ave., La Canada, Calif.

Filed Feb. 17, 1969, Ser. No. 799,701
Int. Cl. C08h *9/06;* **C09k** *1/02*
U.S. Cl. 106—271 **2 Claims**

A high-sensitivity, high-resolving power inspection penetrant developer in which the active developing ingredient is a waxy substance which is a solid or near-solid at room temperature, but which becomes fluid at slightly elevated temperatures. The waxy developer material may be dissolved in a suitable carrier liquid such as water or other inert volatile solvent, and is deposited on test parts by dipping, brushing or spraying, and allowing the carrier liquid to evaporate. When heat is applied to the test parts, during oven drying or by heating subsequent to air-drying, the waxy developer layer becomes a fluid, and a "liquid-film dilution-expansion" type development of penetrant entrapments in surface defects then takes place. When the test parts cool to room temperature, the fluid waxy layer, which now contains developed defect indications, solidifies and prevents excessive bleeding and migration of the indications.

3,607,334

COMPOSITIONS CONTAINING ASPHALT AND SECOND PASS FOOTS OIL

Eugene M. Fauber, Hammond, Ind., assignor to Atlantic Richfield Company

Filed Apr. 29, 1968, Ser. No. 725,188
Int. Cl. C08h *13/00, 17/22;* **C08j** *1/46*
U.S. Cl. 106—279 **10 Claims**

Asphaltic compositions are prepared which are suitable for use as felt saturants or as materials which may be airblown to suitable softening point and penetration for use as roofing material. These compositions comprise a major amount of asphalt and a minor amount of a second pass foots oil derived from a heavy lube distillate.

3,607,335

PIGMENT FORMULATIONS

Horst Belde, and Ewald Daubach, both of Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Nov. 1, 1968, Ser. No. 772,808
Claims priority, application Germany, Nov. 8, 1967, Mar. 23, 1968, P 16 69 737.3;P 17 69 034.5
Int. Cl. C08h *17/02;* **C08g** *51/02*
U.S. Cl. 106—288 Q **8 Claims**

Pigment formulations which contain the pigment dye finally dispersed in diglycol terephthalates or linear oligomers of terephthalic acid and ethylene glycol are outstandingly suitable for mass coloration of thermoplastics.

3,607,336

PROCESS FOR MAKING SOLID SOLUTIONS

Edward E. Jaffe, Union, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of application Ser. No. 738,784 June 21, 1968, now abandoned, which is a continuation-in-part of Ser. No. 515,251, Dec. 20, 1965, abandoned. This application July 9, 1969, Ser. No. 840,500
Int. Cl. C08h *17/14*
U.S. Cl. 106—288 Q **7 Claims**

A process is provided for making a solid solution of at least two quinacridone derivatives by drowning in highly turbulent water, a sulfuric acid solution of at least two of the derivatives to form a precipitate with a particle size smaller than 0.5 micron, and digesting the precipitate at a temperature of from about 40° C. to the boil for about 10 minutes to about 2 hours.

3,607,337

PROCESS FOR THE PRODUCTION OF ORGANICALLY MODIFIED SILICIC ACIDS AND SILICATES

Edith Eisenmenger, Offenbach; Otto Kuhnert, Beuel; Robert Kuhlmann, Keldenich; Peter Nauroth, Wesseling, and Guenter Tuerk, Grossauheim, all of Germany, assignors to Deutsche Gold-Und Siber-Scheideanstalt Vormats Roessler, Frankfurt am Main, Germany

Filed Oct. 7, 1968, Ser. No. 765,683
Claims priority, application Germany, Oct. 12, 1967, Dec. 2, 1967, P 15 92 865.1;P 16 67 465.0
Int. Cl. C08h *17/04*; C08f *45/04*
U.S. Cl. 106—288 Q 12 Claims

A process for modifying silicic acids, gels, and silicates by impregnating them with a wax or a thermoplastic material, such as polyethylene. The silicic acids, silica gels, or silicates can be impregnated either as they are being formed or after they have formed by adding an aqueous emulsion or dispersion of wax or thermoplastic material to an aqueous suspension or dispersion of the silicic acids, gels or silicates. The mixture is then filtered, washed, dried, and finely ground. The organically modified silicic acids, gels, and silicates are useful as delustering agents in lacquer systems.

3,607,338

SYNTHESIS OF ZINC TITANATE PIGMENT AND COATINGS CONTAINING THE SAME

James E. Webb, Administrator of the National Aeronautics and Space Administration with respect to an invention of; Daniel W. Gates, 3026 Crescent Circle, Huntsville, Ala.; Gene A. Zerlaut, 60 E. 32nd St., Chicago, Ill., and Frederick O. Rogers, 639 North Harvey, Oak Park, Ill.

Filed Apr. 11, 1968, Ser. No. 720,546
Int. Cl. C09c *1/36*, *1/04*
U.S. Cl. 106—292 2 Claims

Zinc titanate pigment resistant to degradation of reflective properties upon exposure to ultraviolet radiation in vacuum is prepared by reacting zinc oxide with anatase titanium dioxide at a molar ratio of 2:1 and a temperature of at least 900° C. and contacting the product with a zinc oxide extractant solution. The pigment prepared by this process is combined with a suitable binder to produce degradation-resistant coatings.

3,607,339

SINTERED AGGREGATES

William Davies, Stirling, Scotland, assignor to John G. Stein & Company Limited, Bonnybridge, Scotland

Filed Mar. 4, 1968, Ser. No. 709,960
Claims priority, application Great Britain, Mar. 2, 1967, May 2,1967, 9,923/67; 20,351/67
Int. Cl. C09c *1/00*
U.S. Cl. 106—309 8 Claims

A synthetic aggregate suitable for use in a road surface is prepared by sintering together particles of hard mineral or ceramic material, a flux, and at least sufficient combustible material to complete the endothermic changes occurring in the sintering. The sintered product is in the form of hard particles linked in a cellular structure by strong crystalline ceramic bonds.

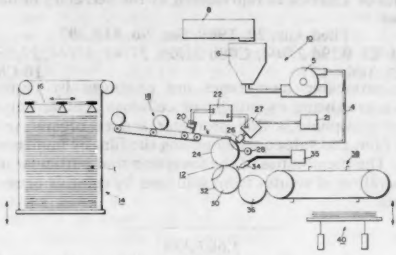
3,607,340

APPARATUS AND METHOD FOR SPOT-COATING SHEET AND WEB MATERIALS

Herman F. Stroupe, Arlington Heights, Ill., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of application Ser. No. 645,675, June 13, 1967, now abandoned. This application Apr. 6, 1970, Ser. No. 24,426
Int. Cl. B05c *3/18*, *11/00*
U.S. Cl. 117—10 10 Claims

A method of and apparatus for accurately and rapidly spot or continually coating either sheet or weblike materials, to place a protective and/or functional coating thereon. A photoelectric or other control mechanism triggers the deposition of the coating material through an "antidrool" valve and nozzle arrangement after which the coated areas may be smoothed or otherwise deformed such as, for example, to form lenticulated lenses on the surface of the coating. These



subsequent forming or deformation steps may, of course, be omitted if only very minute amounts of the coating are being deposited or if contoured or patterned surface areas are desired.

3,607,341

PROCESS FOR PRODUCING A COATED SUBSTRATE

Robert E. Goins, and Phillip M. Morris, both of Chattanooga, Tenn., assignors to G.A.F. Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 594,401, Nov. 15, 1966, now abandoned. This application Nov. 28, 1969, Ser. No. 880,990
Int. Cl. B44d *1/44*
U.S. Cl. 117—10 9 Claims

Improved foam coated textiles and similar materials are produced by (a) foaming an aqueous emulsion polymerized latex composition containing about 1.5 to about 10 parts by weight of a water soluble salt of a saturated organic acid to increase the volume of said latex from about 4 to about 12 times its original volume; (b) applying the thus obtained foam directly to said textile or similar substrate; (c) partially drying the foam and substrate to a moisture content of less than about 20 percent by weight while retaining the foam in its expanded form during the drying process without gelation or curing the polymer; (d) crushing the partially dried and uncured foam, and (e) thereafter drying and curing the resultant crushed foam.

3,607,342

METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES

Masamichi Sato, Saitama, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 29, 1967, Ser. No. 686,668
Claims priority, application Japan, Nov. 29, 1966, 41/78190
Int. Cl. G03g *13/08*
U.S. Cl. 117—17.5 5 Claims

A method of developing an electrostatic image which comprises feeding a toner, its carrier and a material having 1) a smaller apparent density than said carrier, 2) at least the same size as said carrier, and 3) an electrically conductive surface, to a surface having an electrostatic latent image, and effecting relative motion between said surface having said latent electrostatic image and the mixture of the toner, the carrier and the material.

3,607,343

FLAME SPRAY POWDERS AND PROCESS WITH ALUMINA HAVING TITANIUM DIOXIDE BONDED TO THE SURFACE THEREOF

Frank N. Longo, Ellwood, Huntington, and Ferdinand J. Dittrich, Bellmore, L.I., both of N.Y., assignors to Metco Inc., Westbury, Long Island, N.Y.

Continuation-in-part of application Ser. No. 492,887, Oct. 4, 1965, now abandoned. This application Jan. 24, 1967, Ser. No. 611,246

Int. Cl. B44d *1/097*; C04b *35/10*

U.S. Cl. 117—27 8 Claims

A flame spray process and a powder composition for use therein consisting of alumina particles having 1 to 50 percent by volume of titanium dioxide bonded to the surface thereof in which said alumina particles have a particle size between about +5 microns and −100 mesh and in which said titanium dioxide is in the form of particles having a particle size of −10 microns bonded to the alumina particles with a bonding agent which is substantially decomposed or volatilized during the flame spray process.

3,607,344

FLUORESCENT COATINGS

Michael F. Baumann, West Lawn; Eugene H. Reich, Shillington, and Charles E. Coco, Shillington, all of Pa., assignors to Wyomissing Corporation

Filed Nov. 17, 1967, Ser. No. 683,790

Int. Cl. B44d *5/06*

U.S. Cl. 117—33.5 8 Claims

Maximum effectiveness of fluorescent dyes in coatings is achieved by fusing or casting a fluorescent dye-impregnated resin into a continuous light-reflective and emissive film. Exceptionally pure colors are obtained due to the absence of any extraneous or different film-forming resins and high reflectivity is achieved due to the absence of discrete dye-impregnated resin particles that present irregular surfaces to cause a random scattering of incident light. In those instances where comparatively brittle resin systems are used to coat flexible substrates, special methods are provided for tightly adhering these resins to the substrate.

3,607,345

PROCESS FOR COATING PHOTOGRAPHIC EMULSION LAYERS

Donald B. Thomas, Webster; Richard W. Wheeler, Pittsford, and Donald N. Miller, Penfield, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 26, 1968, Ser. No. 724,540

Int. Cl. G03c *1/86*, *1/78*; C03c *1/00*

U.S. Cl. 117—34 11 Claims

Photographic emulsion layers are coated on corona activated polymer surfaces more than about 30 minutes after activation of the polymer surface for improvement of coating uniformity and stability of emulsion layers

3,607,346

LAYERS METHOD OF WET TRANSFERRING UNEXPOSED PHOTOGRAPHIC EMULSION

Rex Leslie Darlow; Guy William Willis Stevens, and Jill Frances Wood, all of Wealdstone, Harrow, England, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 21, 1969, Ser. No. 818,100

Int. Cl. G03c *1/90*, *11/12*

U.S. Cl. 117—34 8 Claims

A method of retaining the sensitomeric properties of photographic silver halide emulsion layers which have been transferred from one support to another via an aqueous bath. Said method comprises suspending a stripped emulsion layer in an aqueous bath comprising a saccharide at a concentration of about 1 to 200 grams per liter, positioning a support beneath and contiguous to said layer, and removing said support bearing the emulsion layer from the bath.

3,607,347

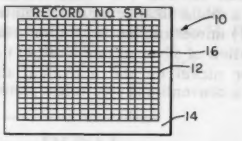
DATA REDUCTION AND STORAGE

John L. Sprague, Holden; Robert S. Pepper, Grafton; Eugene P. Donovan, Westborough, and Frederick W. Howe, Westborough, all of Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed Aug. 4, 1969, Ser. No. 847,328

Int. Cl. G03c *11/00*

U.S. Cl. 117—37 R 7 Claims



Permanent high density storage of alphanumerical information is provided by fine-line cuts which are extended through a thin surface layer to an underlying substrate and are arranged to provide a representation of the alphanumerical characters in microscopic size.

In the method, information in alphanumerical form is reduced to microscopic size and stored in a permanent medium by forming line cuts through a thin overlayer to a contrasting underlayer by photoreduction and photoetching techniques.

3,607,348

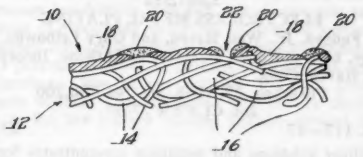
TWICE-COATED CELLULOSIC-FIBER STRUCTURE AND ITS MANUFACTURE

Joseph A. Wray, Columbus; Herbert N. Johnston, Columbus, Ohio, and Robert L. Leaf, Shawano, Wis., assignors to Little Rapids Pulp Company, Shawano, Wis.

Filed May 14, 1968, Ser. No. 735,486

Int. Cl. B44d *1/14*; D21h *1/21*

U.S. Cl. 117—38 14 Claims



A sheet product comprised of a substrate of nonwoven cellulosic fibers (which substrate either has a substantial porosity or is water-sensitive), a discontinuous prime coating of hydrophobic material adhering to the cellulosic fibers, and a second material filling surface interstices, and process for making same.

3,607,349

PRINTING ON SUBSTRATES SUCH AS GLASS USING EPOXY RESIN INK COMPOSITIONS

John E. Dereich, Pittsburgh, Pa., assignor to Neville Chemical Company, Pittsburgh, Pa.

Division of Ser. No. 525,117, Feb. 4, 1966, Pat. No. 3,468,835. Filed May 7, 1969, Ser. No. 839,753

Int. Cl. C03c *17/32*; B44d *1/14*; B44c *1/52*

U.S. Cl. 117—38 7 Claims

A thermosetting, normally solid, low melting, resinous printing ink base, which comprises an epoxy resin, a C_{14}–C_{18} alkanol such as cetyl or stearyl alcohol, a hardener such as a guanidine compound or an acid anhydride, and a viscosity modifier, is used in high speed printing on substrates such as glass.

3,607,350
ELECTROLESS PLATING OF PLASTICS

Richard J. Rathsack, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 5, 1967, Ser. No. 687,988
Int. Cl. B44d *1/092;* **C23c** *3/02*
U.S. Cl. 117—47 A **9 Claims**

An organic plastic substrate is metal plated by the following essential steps (1) sulfonation with SO_3 in a chlorinated hydrocarbon solvent, (2) neutralization of the sulfonated plastic in a dilute alkaline aqueous solution of an alkali compound, (3) immersing the neutralized, sulfonated plastic in a basic solution of silver nitrate and (4) coating a thin coat of copper or nickel on the activated, sulfonated plastic by means of a conventional electroless plating bath.

3,607,351
PROCESS FOR METAL PLATING OF SUBSTRATES

Sung Ki Lee, Niagara, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of application Ser. No. 671,337, Sept. 28, 1967, now abandoned. This application Aug. 2, 1968, Ser. No. 759,531
Int. Cl. B44d *1/092;* **C23c** *3/02*
U.S. Cl. 117—47 A **34 Claims**

Substrates, including plastics, are plated with metals by pretreatment of the substrate surfaces with phosphorus in an organic solvent and subjecting the phosphorus-treated surface to water and/or a surfactant to impregnate the surface with phosphorus. The resulting treated surface is contacted with a metal salt or complex thereof, to form a metal-phosphorus compound. The step of contacting with water and/or a surfactant can be accomplished by providing a layer of water or a layer of surfactant on the surface of the phosphorus-organic solvent contacting bath. The resulting treated surface is either conductive or is capable of catalyzing the reduction of a metal salt to produce a conductive surface. Such conductive surfaces are readily electroplated by conventional techniques.

3,607,352
ELECTROLESS METAL PLATING

Earl J. Fadgen, Jr., West Haven, and Gary Leibowitz, Woodbridge, both of Conn., assignors to Enthone, Incorporated, West Haven, Conn.

Filed Nov. 29, 1968, Ser. No. 780,200
Int. Cl. C23c *17/00*
U.S. Cl. 117—47 **23 Claims**

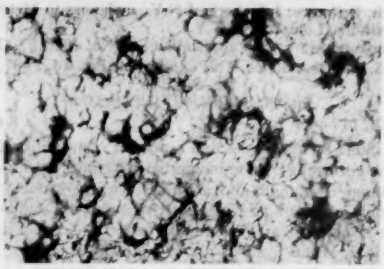
Sensitizer solutions and sensitizer concentrates for use in forming the sensitizer solutions, utilizable in chemical reduction metal plating. The sensitizer solution comprises an acid aqueous solution containing stannous chloride, HCl, and one or more of an alpha hydroxy dicarboxylic acid and water-soluble, solution-compatible salts thereof, for example tartaric acid, present in effective amount sufficient to inhibit formation of tin oxychloride. The sensitizer solution preferably also contains nickel and/or cobalt ions as an accelerator for the reduction and deposition of the catalytic noble metal during the activating of the surface to be electrolessly plated, and a buffering agent.

3,607,353
SURFACE TREATMENT FOR ELECTROPLATING

Ismat A. Abu-Isa, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 16, 1969, Ser. No. 867,006
Int. Cl. B44d *1/02*
U.S. Cl. 117—47 **8 Claims**

A method for improving the adhesion between a metal coating and a nylon surface. The method includes the steps of treating a nylon surface with an aqueous solution of iodine and iodine ion in which the concentration of the iodine is at least about 0.2 molar and the concentration of the iodine ion is at least about 0.3 molar, and subsequently washing the surface to remove the iodine as quickly as possible prior to plating the polymer.



3,607,354
METHOD OF DELUSTERING POLYETHYLENE TEREPHTHALATE FILM

Lester C. Krogh, Roseville Township, and Richard E. Brink, White Bear Township, both of Ramsey County, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

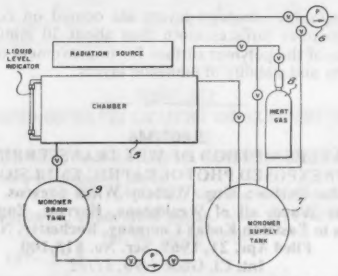
Continuation of application Ser. No. 552,684, Nov. 7, 1955, now abandoned. This application Nov. 14, 1969, Ser. No. 870,616
Int. Cl. B44d *1/092*
U.S. Cl. 117—47 R **6 Claims**

The normally lustrous surface of a polyethylene terephthalate film is delustered and made capable of forming a strong adherent bond with adhesive compositions. The film is treated with a coating of a hydroxybenzene derivative solvent primer material.

3,607,355
METHOD OF MAKING FUSED VENEER-PLASTIC PRODUCT

William A. Loeb, Chappaqua, N.Y., assignor to ISO Nuclear Corporation, New York, N.Y.

Filed Mar. 6, 1967, Ser. No. 620,708
Int. Cl. B44d *1/50, 1/28;* **B27k** *3/08*
U.S. Cl. 117—59 **3 Claims**



This invention is directed to the production of fused veneer-plastic products in multiunit quantities by impregnating a separator-interleaved stack of veneer sheets with a liquid plastic monomer and polymerizing the monomer in situ by irradiation with X or gamma rays.

3,607,356

IMPARTING FLAME RESISTANCE TO FIBROUS TEXTILES FROM AN ALKALINE MEDIUM

John V. Beninate, Grenta; Eileen K. Boylston, New Orleans; George L. Drake, Jr., Metairie, and Wilson A. Reeves, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture

Filed Oct. 4, 1968, Ser. No. 767,584
Int. Cl. B44d *1/44*; C09d *5/18*
U.S. Cl. 117—62.2 12 Claims

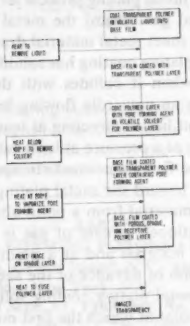
Flame resistance has been imparted to fibrous textiles by application of an aqueous alkaline solution containing tris (hydroxymethyl) phosphine (heretofore referred to as THP) and tetrakis (hydroxymethyl) phosphonium hydroxide (heretofore referred to as THPOH) followed by heat drying to 10–20 percent moisture content, and finally polymerizing the phosphorous material in the fabric with ammonia vapor. The invention provides an improved process for flameproofing textiles, particularly lightweight apparel fabrics whereby the resulting treated textile materials are rendered flame resistant with little or no loss in tearing strength and tensile strength or undesirable change in hand. Cellulosic textiles treated by this process retain their flame resistant properties after repeated laundering.

3,607,357

INK RECEPTIVE CONVERTIBLE FILMS AND PROCESS FOR THEIR PREPARATION

Hugh T. Findlay, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 5, 1968, Ser. No. 750,322
Int. Cl. B44d *1/14*, *5/04*, *5/02*
U.S. Cl. 117—63 1 Claim



Ink receptive convertible films suitable for use in copying systems or projection slides are prepared by coating the surface of a transparent film with a fusible polymer material such as polyvinyl acetate with a pore forming agent such as ammonium carbonate. The polymer containing the pore forming agent to volatilize and render the film porous, and ink receptive. The film is then readily printed with a conventional ink after which the nonprinted portion of the opaque coating is rendered transparent through the application of heat and/or pressure, or the action of solvent vapors. The printed matter substantially retains the print quality it possessed during the ink receptive opaque stage.

3,607,358

METHOD OF DYEING A POLYURETHANE SURFACE LAYER COATED ON A SUBSTRATE AND RESULTANT PRODUCT

Friedrich Dangl, Mechenhard, and Klaus Gerlach, Obernau, both of Germany, assignors to Glanzstoff AG., Wuppertal, Germany

Filed Dec. 18, 1968, Ser. No. 784,938
Claims priority, application Germany, Dec. 23, 1967, P 16 19 577.0
Int. Cl. D06n *3/14*; D06p *1/02*
U.S. Cl. 117—63 13 Claims

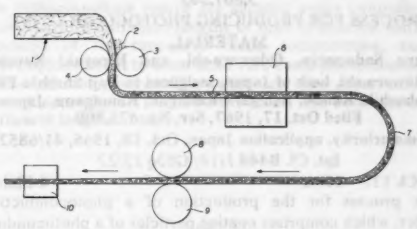
Method of dyeing a polyurethane surface layer of an artificial leather by applying thereto a spirit-soluble dye dissolved in a mixture of organic solvents including at least one solvent which is a swelling agent for the polyurethane.

3,607,359

PROCESS FOR THE MANUFACTURE OF UNWOVEN FABRICS BONDED WITH A BINDING AGENT AND HAVING A SMOOTH SURFACE

Dieter Bischoff, Hofenweg, and Harald Hordt, Am Drachenstein, both of Germany, assignors to Carl Freudenberg, Weinheim (Bergstr.), Germany

Filed Jan. 10, 1968, Ser. No. 696,744
Claims priority, application Germany, Jan. 12, 1967, F51237
Int. Cl. B44d *1/44*; B32b *27/12*
U.S. Cl. 117—65.2 3 Claims



Production of bonded nonwoven fabrics with a latex coagulated at relatively low temperature, where coagulation is followed by passing the fabric latex between heated rollers and then subjecting the fabric latex to vulcanization.

3,607,360

METHOD OF IMPROVING ADHESION OF LOW FRICTION COATING TO ELASTOMERS

Otto C. Elmer, 720 Hillsdale Ave., Akron, Ohio

Filed Apr. 3, 1969, Ser. No. 813,318
Int. Cl. B44d *1/14*; B32b *27/08*
U.S. Cl. 117—72 5 Claims

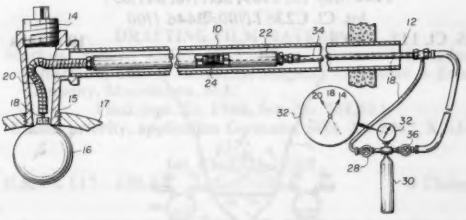
This invention concerns methods of improving the adhesion between low-friction coatings and elastomeric surfaces by the steps of precoating an EPDM elastomeric surface with a chlorinated ethylene-propylene copolymer containing from about 15 percent to about 25 percent chlorine and, applying a polyurethane low-friction coating to said precoated elastomeric surface. The copolymer may also be used as an additive to the low-friction coating mixture instead of as a precoat.

3,607,361

BALLOON BACKING FOR PIPE LINING

Hanford Z. Hight, Short Hills, N.J., assignor to Bonded/Products, Inc., South Orange, N.J.

Filed Nov. 15, 1968, Ser. No. 784,507
Int. Cl. B05c *8/02*, *8/00*
U.S. Cl. 117—95 5 Claims



Balloon inserted through gas pipe, inflated in gas main beyond angle fitting, deflated and withdrawn thereinto, reinflated and lining material charged thereagainst at greater

pressure. Pressure indicated on outside gauge verifies position of balloon.

3,607,362

PLASTISOL GASKET COMPOSITION

James B. Cormack, Jr., Oak Park, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed May 14, 1969, Ser. No. 824,696
Int. Cl. B44d *1/08, 1/00*
U.S. Cl. 117—95 6 Claims

Closure caps are lined with plastisol compositions which exhibit low orders of gas transmission, the compositions being comprised of a carboxyl containing vinyl chloride polymer and an epoxidized unsaturated fatty oil.

3,607,363

PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL

Shigeru Sadamatsu, Odawara-shi, and Hiroyuki Kaneko, Odawara-shi, both of Japan, assignors to Fuji Shashiu Film Kabushiki Kaisha, Ashigara-Kamigun, Kamagawa, Japan

Filed Oct. 17, 1967, Ser. No. 675,800
Claims priority, application Japan, Oct. 18, 1966, 41/68527
Int. Cl. B44d *1/18;* G03g *13/22*
U.S. Cl. 117—100A 4 Claims

A process for the production of a photoconductive powder, which comprises coating particles of a photoconductive material onto the surface of particles of a core material having an absorption ratio of less than 80 percent, at a thickness of 5 microns, to a light in the main region of the intrinsic sensitivity wave length region in which said photoconductive material exhibits a photoconductive property.

3,607,364

PROCESS FOR COATING PHARMACEUTICAL SOLID FORMS

Benito Lopez, 300 Parsippany Road, Apt #181 E, Parsippany, N.J., and Saul S. Kornblum, 144 Short Hills Ave., Springfield, N.J.

Filed Sept. 16, 1968, Ser. No. 760,059
Int. Cl. A61k *9/00;* B44d *1/08*
U.S. Cl. 117—100 A 9 Claims

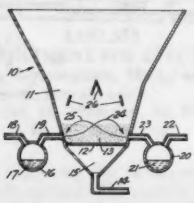
The invention concerns a coating process for coating a pharmaceutical solid form, which comprises applying a foamed coating medium to the solid form surface, and then urging the coating medium against the solid form surface to break down the foam and produce an even coat of the coating medium on the solid form surface.

3,607,365

VAPOR PHASE METHOD OF COATING SUBSTRATES WITH POLYMERIC COATING

James A. Lindlof, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 492,997, Oct. 5, 1965, abandoned.
Filed May 12, 1969, Ser. No. 841,657
Int. Cl. C23c *11/00;* B44d *1/00*
U.S. Cl. 117—100 R 10 Claims



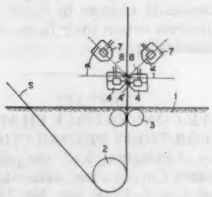
A method of providing a shaped substrate with a thin, uniform, dense, protective, polymeric coating, especially the reaction product of polyisocyanate and polyamine. The substrate is exposed to vapors of a compound having a plurality of reactive end groups, and subsequently exposed to vapors of a second compound having a plurality of radicals which are highly reactive with the end groups of the first compound. The cycle is repeated until a polymeric coating of desired thickness has been built up.

3,607,366

REMOVAL OF EXCESS MOLTEN METAL COATINGS BY GAS BLAST WITHOUT RIPPLE FORMATIONS ON COATED SURFACES

Kazutoshi Kurokawa, Kitakyushu, Japan, assignor to Yawata Iron & Steel Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1968, Ser. No. 775,776
Int. Cl. B05c *11/06;* C23c *1/02*
U.S. Cl. 117—102M 11 Claims



An improvement in the method of controlling a metal material in a hot-dip metal plating process jetting at least one stream of compressed gas toward the metal plating coating on the surface of the sheet metal material drawn out of a hot-dip bath before said plating coating has solidified. The stream of compressed gas when it collides with the coated sheet metal material forms an upwardly flowing branch stream of gas. The improvement lies in directing at least one stream of ripple eliminating gas at a pressure at least substantially equal to the pressure of the first mentioned stream of compressed gas downwardly and toward the metal plating coating on the surface of the sheet material from a point above the point at which said first mentioned stream of gas is directed at the surface of the sheet material and at a point ahead of, with respect to the direction of advance of the sheet material, the point at which the metal plating coating solidifies and sufficiently close to the point at which the first mentioned stream of gas collides with said sheet material to cancel the upwardly flowing branch stream of gas. The stream of ripple eliminating gas prevents formation of ripple patterns on the plated surface of the sheet material.

3,607,367

HIGH-STRENGTH, HIGH-MODULUS, LOW DENSITY, BORON SILICIDE MONOFILAMENTS, AND METHOD OF MAKING SAME

Lee C. McCandless, Reston, Va., and James C. Withers, Accokeek, Md., assignors to General Technologies Corporation, Reston, Va.

Continuation-in-part of application Ser. No. 519,625, Jan. 10, 1966, now abandoned. This application Apr. 1, 1968, Ser. No. 717,896
Int. Cl. C23c *11/08*
U.S. Cl. 117—106 A 3 Claims

This invention relates to high-strength, high-modulus low density boron silicide monofilaments, and to a method of making the same. The boron silicide monofilaments herein comprise a coating of about 40–70 wt. percent boron and about 60–30 wt. percent silicon on a substrate wire. The method for preparing such boron solicide monofilaments comprises reacting a boron halide, such as boron trichloride, silane and hydrogen in the vapor phase at elevated tempera-

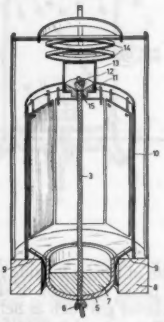
tures, e.g. about 1,000°–1,300° C. The reaction is carried out at atmospheric pressure. Usually the boron trichloride, silane and hydrogen are present in a concentration of about 10–40 mole percent, 0.1–1.5 mole percent and 55–90 mole percent, respectively.

3,607,368

METHOD OF COATING SUBSTRATES BY VAPOR DEPOSITION

Johannes Jacobus Asuerus Ploos Van Amstel, Emmasingel, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Oct. 8, 1968, Ser. No. 765,826
Claims priority, application Netherlands, Oct. 10, 1967, 6713713
Int. Cl. C23c *13/12*
U.S. Cl. 117—106 6 Claims



A method of coating substrates by vapor deposition. The material to be deposited is taken up in a lacelike body built up from graphite yarn heated to the vaporization temperature by the passage of electrical current.

3,607,369

METHOD FOR FORMING POROUS ALUMINUM LAYER

Louis Bela Batta, Grand Island, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 11, 1968, Ser. No. 759,204
Int. Cl. C23c *17/00*
U.S. Cl. 117—119 10 Claims

A method for forming a thin porous aluminum layer of interstitial and interconnected small pores on aluminum base material by mixing a slurry including a selected elemental bonding component, and aluminum powder matrix, a relatively insoluble aluminum brazing flux, and a vehicle, loosely coating the base material with the slurry, drying the coating and thereafter brazing the coating together and to the base material.

3,607,370

PRESSURE-SENSITIVE ADHESIVE TAPE COMPRISING GLUTEN HYDROLYPATE DERIVATIVES

Catherine Aranyi, Chicago; Kurt Gutfreud, Park Forrest; Ervin J. Hawrylewicz, Olympia Fields, and Joseph S. Wall, Peoria, all of Ill., assignors to The United States of America as represented by the Secretary of Agriculture

Division of Ser. No. 680,030, No. 2, 1967, Pat. No. 3,522,197.
Filed May 21, 1969, Ser. No. 842,061
Int. Cl. C09j *7/02*
U.S. Cl. 117—122 P 2 Claims

A pressure-sensitive adhesive tape comprising a backing with a pressure-sensitive coating comprising epoxy derivatives of the large peptide fraction of partially hydrolyzed gluten polymerized with various acrylic compounds.

3,607,371

PHOSPHATE-COATED RARE-EARTH OXIDE COMPOSITIONS AND A PROCESS FOR PRODUCING SAME

James W. Haynes, and Kenneth H. Shaner, both of Towanda, Pa., assignors to Sylvania Electric Products Inc.

Filed Oct. 30, 1969, Ser. No. 872,747
Int. Cl. B05c *7/14*; B44d *1/02*
U.S. Cl. 117—100 B 14 Claims

Rare-earth oxide compositions can be improved in handling characteristics by increasing the bulk density of the compound by uniformly coating the finely divided particles with a corresponding rare-earth phosphate.

Aqueous media comprising suspensions of finely divided particles of rare-earth oxide compositions and a water-soluble orthophosphate source are agitated under controlled pH conditions for sufficient lengths of time to dissolve sufficient amounts of the rare-earth oxide compositions, and to reprecipitate them to form solid rare-earth-phosphate-coated rare-earth compounds. The solids are then separated from the aqueous phases, washed with water, and heat-treated for sufficient lengths of time.

3,607,372

SELF-CLEANING CATALYTIC COATING FOR OVEN SURFACES

John W. Gilliom, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio

Filed Feb. 7, 1968, Ser. No. 703,538
Int. Cl. B32b *15/08*
U.S. Cl. 117—132 BS 1 Claim

A coating composition of a high-temperature release finish, such as silicone resin, and an oven catalyst, for cooking oven surfaces. The finish and catalyst are mixed, the composition applied to the surface, air dried, and then heat cured.

3,607,373

HEAT STABILITY IMPROVEMENT OF HYDROCARBON FIBERS OR FABRICS

Richard S. Berger, and Lee O. Edmonds, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed Dec. 19, 1966, Ser. No. 602,525
Int. Cl. D06m *11/04*
U.S. Cl. 117—138.8 E 4 Claims

The thermal stability of polyolefins is increased by contact with a hydrosulfite.

3,607,374

DRAFTING FILM MATERIALS

Markus Seibel, Mainz, and Klaus Thoese, Wiesbaden-Schierstein, both of Germany, assignors to Keuffel & Esser Company, Morristown, N.J.

Filed Sept. 23, 1968, Ser. No. 761,811
Claims priority, application Germany, Sept. 25, 1967, K 63-437
Int. Cl. B32h *27/08*
U.S. Cl. 117—138.8 F 4 Claims

A noncurling drafting film of good ink receptivity is prepared by coating a polyester film support with a silica pigmented composition of an acrylic ester copolymer and a polyvinyl alcohol cross-linked with an aldehyde condensate resin.

3,607,375

PLASTIC SHEET MATERIAL HAVING DULL SURFACE COATING COMPRISING FILM OF POLYMER HAVING DISPERSED POLYESTER PARTICLES

Aleksander Jerzy Wiejak, Hyde, England, assignor to Imperial Chemical Industries Limited, Millbank, London, England

Continuation-in-part of application Ser. No. 514,397, Dec. 16, 1965, now abandoned, Continuation-in-part of application Ser. No. 524,876, Feb. 3, 1966, now abandoned, Continuation-in-part of application Ser. No. 528,401, Feb. 18, 1966, now abandoned. This application Feb. 16, 1968, Ser. No. 705,935

Claims priority, applications Great Britain, Dec. 23, 1964, Dec. 23, 1964, Feb. 18, 1965, Feb. 23, 1965, 52272/64, 52273/64, 7076/65, 7817/65

Int. Cl. B32b *27/20, 27/36*

U.S. Cl. 117—138.8UA **6 Claims**

A lacquer comprising a homogeneous or heterogeneous dispersion of a linear polyester in a solution of a film-forming polymer in a liquid. Useful linear polyesters are polymers of ethylene terephthalate, ethylene isophthalate, ethylene orthophthalate, propylene terephthalate, propylene isophthalate, propylene orthophthalate and copolymers of two or more of these. Especially suitable film-forming polymers for use with the invention are copolyesters of ethylene glycol, terephthalic acid and isophthalic acid. Particularly suitable liquids for use with the invention are ethylene carbonate and propylene carbonate. In preference in the lacquer the proportion by weight of linear polyester is in the range 2 percent to 30 percent, but preferably in the range 5 percent to 20 percent, of the total weight of linear polyester plus film-forming polymer in the lacquer. In a preferred lacquer the proportion by weight of linear polyester plus film-forming polymer based on the total weight of lacquer is in the range 5 percent to 35 percent, but is more preferably in the range 10 percent to 20 percent.

3,607,376

NOVEL INTERPOLYMER BLENDS

Robert B. Blance, East Longmeadow; David R. Cahill, Wilbraham, and Peter Wachtel, Springfield, all of Mass., assignors to Monsanto Company, Saint Louis, Mo.

Filed Dec. 13, 1968, Ser. No. 783,700

Int. Cl. B32b *27/10;* **D21h** *1/40*

U.S. Cl. 117—155 UA **11 Claims**

Disclosed herein are polymer blends comprising a first interpolymer of a vinyl alcohol ester and at least one ethylenically unsaturated acid ester and a second interpolymer comprising a vinyl aromatic compound, at least one ethylenically unsaturated acid ester and at least one compound containing one or more acid groups. These blends are particularly useful as zinc oxide binders. The polymer blends are also useful as adhesives and coatings for such substrates as paper, glass and metal foil.

3,607,377

ELECTROCONDUCTIVE PAPER

Robert A. Cross, Waltham, and John F. Hegarty, Somerville, both of Mass., assignors to Amicon Corporation, Lexington, Mass.

Filed Dec. 30, 1968, Ser. No. 788,087

Int. Cl. B44d *1/18*

U.S. Cl. 117—201 **10 Claims**

A cellulosic paper sheet, suitable for use as a substrate for receiving a coating of a light-sensitive electroconductive material such as zinc oxide, which paper sheet comprises a coating thereon of from 0.5 to 5 lbs. per ream of colloidal chrysolite asbestos and a quantity of lithium chloride therein to impart a surface resistivity of less than 10^{10} ohms at a relative humidity of 15 percent, while maintaining a volume resistivity of greater than 10^{10} ohms under the same environmental conditions.

3,607,378

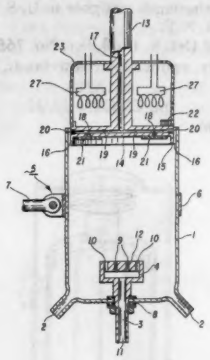
TECHNIQUE FOR DEPOSITING SILICON DIOXIDE FROM SILANE AND OXYGEN

Edward M. Ruggiero, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of application Ser. No. 606,177, Dec. 30, 1966, now abandoned. This application Oct. 27, 1969, Ser. No. 869,957

Int. Cl. C23c *11/00*

U.S. Cl. 117—201 **4 Claims**



A pinhole-free film of silicon dioxide is deposited on a substrate by the vapor phase oxidation of silane in dilute admixture with an inert carrier gas such as helium, for example. By maintaining a high flow rate of helium to carry the silane and oxygen upward in contact with an inverted substrate, in combination with an oxygen flow rate appreciably higher than that of silane, a high rate of silicon dioxide deposition is assured with a minimum of quartz smoke, and without excessive premature oxidation of the silane.

3,607,379

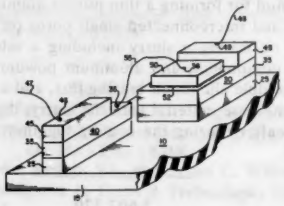
MICROELECTRONIC INTERCONNECTION SUBSTRATE

Charles Z. Leinkram, Bowie, and Richard L. Prom, Oxon Hill, both of Md., assignors to The United States of America as respresented by the Secretary of the Navy

Filed Jan. 22, 1968, Ser. No. 699,724

Int. Cl. B44d *1/18;* **C23b** *5/56*

U.S. Cl. 117—212 **5 Claims**

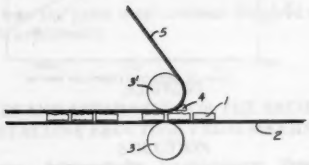


An interconnection substrate is disclosed for use in hybrid microelectronic systems interconnecting transistors, resistive elements, semiconductor-integrated circuits, and other microelectronic circuit elements. The substrate consists of an insulative base and three metal films, for example, a first chromium film, a second gold film metallurgically bonded to the chromium film, and a third nickel film bonded to the gold.

The interconnection substrate is prepared by (sequential) deposition of chromium, gold, and nickel onto a ceramic wafer. Alternatively the nickel film may be plated by other conventional methods. The desired circuit is then etched photolithographically to produce nickel pads for tin-lead sol-

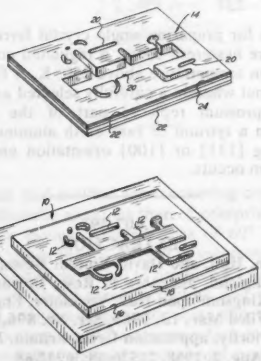
dered or welded connections. A second etching is made to produce gold pads suitable for thermal compression bonding, ultrasonic wire bonding and gold-silicon eutectic bonding. Circuits elements in the form of chips are then connected to the connection substrate and the entire unit encapsulated in a suitable protective material.

3,607,380
METHOD OF SURFACE COATING
Johan-Petter Brynjulf Thams, Gronviksvagen 69, Stockholm Bromma, Sweden
Filed Mar. 18, 1968, Ser. No. 713,937
Claims priority, application Sweden, Mar. 17, 1967, 3763/1967
Int. Cl. B44d *1/18;* **B44c** *1/02*
U.S. Cl. 117—212 **12 Claims**



This invention pertains to a process for producing surfaces of desired and specified texture and/or physical, chemical, electrical and/or optical properties involving use of a viscous liquid treating composition.

3,607,381
SPRAY PROCESS FOR CREATING ELECTRICAL CIRCUITS
Thomas Edward Fairbairn, Westland, Mich., assignor to Platron Corporation, Detroit, Mich.
Filed June 14, 1968, Ser. No. 737,170
Int. Cl. B05b *7/20;* **B44d** *1/18*
U.S. Cl. 117—212 **2 Claims**



Electrically conductive pathways are applied to a metallic base by means of the plasma flame spray process, which process is also employed to apply an intermediate layer of ceramic insulation. The conductor pattern is formed into a kaolin template through which the powdered copper conductor material is sprayed.

3,607,382
METHOD OF PRODUCING PHOTOVARNISH MASKS FOR SEMICONDUCTORS
Heinz Henker, Wittelsbacherstr. 8, Munich 5, Germany
Filed Oct. 18, 1968, Ser. No. 768,797
Claims priority, application Germany, Oct. 23, 1967, S 112516
Int. Cl. B44d *1/02, 1/18, 1/50*
U.S. Cl. 117—212 **14 Claims**

Described is a method of producing photovarnish masks for semiconductors. A photovarnish layer, positioned on a workpiece, is selectively illuminated, whereupon portions of the photovarnish layer are removed through developing. The illumination is effected by means of a thin electron beam, moved essentially along a single coordinate direction. The photovarnish layer to be illuminated is moved perpendicularly to the movement direction of the electron beam. The respective movement length of the electron beam is limited according to the pattern of the photovarnish mask to be produced.

3,607,383
METHOD FOR TREATING DEFECTIVE WINDINGS OF ROTATING ELECTRICAL MACHINERY
Harry Clarence DeVroome, London, England, assignor to Ayrodev Processes Limited, Poplar, England
Filed Feb. 24, 1969, Ser. No. 801,804
Claims priority, application Great Britain, Oct. 8, 1968, 47626/68
Int. Cl. B44d *1/18*
U.S. Cl. 117—213 **5 Claims**

Locally defective insulation in the winding of a rotating electric machine is scanned with a megohmmeter to find the defective areas which are then cleaned with a solution of a cationic surfactant in an organic solvent until insulation resistance reaches a stable maximum value. The solvent is permitted to evaporate, preferably at elevated temperature, and the defective area is treated with insulating varnish to restore the insulation.

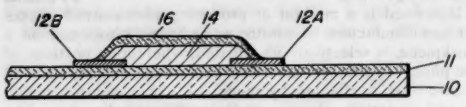
3,607,384
THIN-FILM RESISTORS HAVING POSITIVE RESISTIVITY PROFILES
Frank D. Banks, Dahlgren, Va., assignor to Western Electric Company, Incorporated, New York, N.Y.
Filed July 11, 1968, Ser. No. 744,116
Int. Cl. B44d *1/18*
U.S. Cl. 117—215 **2 Claims**

A thin-film resistor is provided having variable or nonhomogeneous resistivity which varies in a positive resistivity profile from the substrate to the film surface such that the resistivity at the surface of the thin-film is higher than the resistivity of the film adjacent to the substrate. Thin-film resistors, such as of tantalum nitride having a resistivity which varies either progressively or stepwise in a positive resistivity profile are obtained by (a) decreasing the voltage from one level to a lower level during sputtering, and/or (b) increasing the nitrogen concentration from one level to a higher level during vacuum deposition.

3,607,385
METHOD OF MANUFACTURING SOLID CAPACITORS
Takeshi Namikata, Kawasaki-shi; Kentaro Hirata, Suzaka-shi, and Yuji Ichikawa, Suzaka-shi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Oct. 21, 1968, Ser. No. 769,121
Claims priority, application Japan, Feb. 13, 1968, 43/9057
Int. Cl. B44d *1/18*
U.S. Cl. 117—215 **3 Claims**

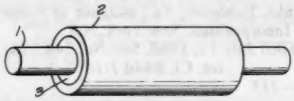
Described is a method of manufacturing a solid capacitor wherein a capacitor is constituted by forming a film or forming metal and attaching manganese dioxide. The method is characterized in that a solution of manganese nitrate in water impregnated in the element is first pyrolyzed under a high temperature and at the moment when generation of NO_2 gas is nearly finished, the ambient temperature is kept lower than said temperature.

3,607,386
METHOD OF PREPARING RESISTIVE FILMS
Robert T. Galla, and Harold M. Greenhouse, both of Baltimore, Md.
Filed June 4, 1968, Ser. No. 734,330
Int. Cl. B44d 1/18
U.S. Cl. 117—217 7 Claims



A method of preparing temperature stable high resistance, thin film resistors, wherein a metal whose oxide or silicide has a higher resistivity than the pure metal is vacuum evaporated through a suitable mask onto a glass substrate which has been completely undercoated with a layer of silicon monoxide. Immediately after the deposition of the metallic film a silicon monoxide overcoat is deposited through the same mask. The resulting resistors are heat treated for such time as is required to bring the resistors to the desired value. The resulting resistors have a low-temperature coefficient and relatively high sheet resistivities.

3,607,387
FLAME RESISTANT POLYIMIDE-COATED CONDUCTOR HAVING A LINEAR POLYIMIDE LAYER COVERED BY AN AROMATIC POLYAMIDE
Vincent L. Lanza, and Edward C. Stivers, both of Atherton, Calif., assignors to Raychem Corporation, Menlo Park, Calif.
Filed Sept. 18, 1968, Ser. No. 760,713
Int. Cl. H01b 7/02, 3/00
U.S. Cl. 117—218 9 Claims

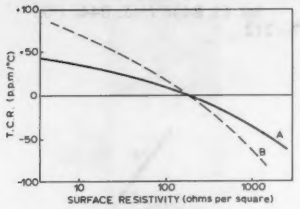


Laminates primarily for electrical insulation comprise at least one lamina of a thermoplastic polyimide, e.g., poly(1, 12-dodecamethylene pyromellitimide) and a covering lamina of an infusible or high-melting polymer, especially an aromatic polyimide. An insulated airframe wire is described in detail.

3,607,388
METHOD OF PREPARING PHOTOCONDUCTIVE LAYERS ON SUBSTRATES
Hiroo Hori, Kawasaki-shi; Shigeo Tsuji, Fujisawa-shi, and Yuji Kiuchi, Yokohama-shi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan
Filed Mar. 14, 1968, Ser. No. 713,043
Claims priority, application Japan, Mar. 18, 1967, 42/16707
Int. Cl. B44d 1/02; G03g 5/00
U.S. Cl. 117—224 3 Claims

A method of preparing a vapor-deposited layer having photoconductivity on a substrate, in which lead oxide and at least one of the compounds selected from the group consisting of chalcogenides of Cu, Ag, Zn, Cd, Hg, Ga, In, Tl, Ge, Sn, Sb and Bi are evaporated simultaneously from separate sources, and are vapor-deposited on the substrate. This vapor deposition is carried out in an oxygen or oxygen-containing atmosphere.

3,607,389
METALLIC FILM RESISTORS
Giovanni Canegallo, and Ubaldo Costa, both of Milan, Italy, assignors to Societe Elettrotecnica Chimica Italiana, Milan, Italy
Filed Oct. 18, 1968, Ser. No. 768,659
Claims priority, application Italy, Oct. 21, 1967, Feb. 15, 1968, 21866A/67;1208A/68
Int. Cl. H01c 7/00
U.S. Cl. 117—227 5 Claims



Precision resistors are produced by depositing, at a temperature of from 40 to 90° C., a nickel-phosphorus film upon former rods of steatite from an electroless plating solution having a pH value of 5 to 7 and containing specified amounts of a water soluble hypophosphite, nickel sulfate, soluble pyrophosphate, a water soluble orthophosphate and a water soluble salt of ethylenediaminetetraacetic acid, the resulting nickel-phosphorus film resistor rods being subsequently subjected to heat stabilization; the temperature coefficient of resistance of the resulting precision resistors is in the vicinity of zero.

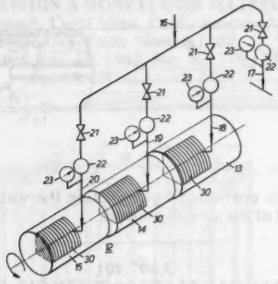
3,607,390
SINGLE CRYSTAL FERRIMAGNETIC FILMS
Richard L. Comstock, San Jose, and Daniel A. Nepela, Saratoga, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sept. 29, 1969, Ser. No. 862,080
Int. Cl. H01f 10/02
U.S. Cl. 117—237 5 Claims

A process for preparing single crystal ferrimagnetic films having square hysteresis loops, a regulated coercivity, and a compensation temperature above 250° K. A film of gadolinium iron garnet wherein a carefully selected amount of terbium or dysprosium replaces part of the gadolinium is deposited on a tytrium or rare earth aluminum garnet substrate having [111] or [100] orientation and heated until crystallization occurs.

3,607,391
EXTRACTION
James Shann, Hull, and David Vincent Bessant, South Cave, both of England, assignors to Rose, Downs & Thompson Limited, Kingston-upon-Hull, Yorkshire, England
Filed Mar. 13, 1969, Ser. No. 806,909
Claims priority, application Great Britain, May 7, 1968, Aug. 2, 1968, 21526/68;36942/68
Int. Cl. C13d 1/12, 1/10, 1/04
U.S. Cl. 127—7 5 Claims

A method of, and apparatus for, extracting a soluble component of a soluble material, in which the material is introduced into a press and subjected to pressure and while that pressure is maintained on the material, a liquid solvent for the component is introduced into the press so as to pass through the material. In one variant of the invention the pressure on the material is increased after the liquid solvent has

been added and in another variant the liquid solvent introduced into the press itself contains dissolved elements of the soluble component.

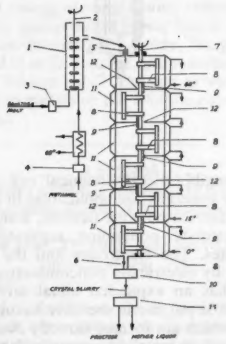


3,607,392

PROCESS AND APPARATUS FOR THE RECOVERY OF CRYSTALLINE FRUCTOSE FROM METHANOLIC SOLUTION

Karl Lauer, Schriescheim Strahlenburg; Peter Stephan, Worms, and Georg Stoeck, Mannheim-Waldhof, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

Filed Dec. 5, 1968, Ser. No. 781,411
Claims priority, application Germany, Dec. 21, 1967, P 16 43 720.0
Int. Cl. C13k *9/00*, *1/10*; C13f *1/02*
U.S. Cl. 127—15 13 Claims



An apparatus and method for recovering crystalline fructose from methanolic solutions thereof comprising dissolving molten fructose having a temperature of 60° 75° C. and a water content of less than 3 percent in substantially the same volume of preheated methanol to produce a solution having a concentration of 55–70 percent fructose and a temperature of 40°–50° C., continuously introducing the thusly formed solution into the top end of a system which includes a double-walled vertically arranged seed crystal containing cylindrical vessel, s stirrer shaft therein disposed inside this seed crystal-containing vessel, a plurality of horizontal dividers provided with central openings arranged in said system so as to divide the same into zones to be maintained at different temperatures, continuously withdrawing from the bottom end of said system an amount of crystalline fructose dispersed in methanol substantially equivalent to the amount of solution being charged into said system and thereafter separating the crystalline fructose from the methanol.

3,607,393

METHOD OF PREPARING A FOOD BATTER STARCH

Ronald R. Gabel, Western Springs, Ill.; Robert M. Hamilton, Minnetonka, Minn., and Wayne E. Dudacek, Lyons, Ill., assignors to CPC International Inc.

Filed Dec. 21, 1967, Ser. No. 692,320
Int. Cl. C13l *1/08*
U.S. Cl. 127—32 10 Claims

Method of preparing a starch useful as a batter mix to prepare breaded, deep-fried foods. Particularly covers a method of preparing a batter starch by treating an acidic aqueous slurry of raw starch with a mixture of hypohalogenous acid and halogen, followed by treatment with an oxidizing agent. In a preferred embodiment an alkali metal hypohalite such as sodium hypochlorite is the treatment agent in the first step and the oxidizing agent is hydrogen peroxide. The resultant starch when used as a batter mix results in a fried batter coating displaying a high degree of adhesion and cohesion.

3,607,394

NOVEL PREGELATINIZED STARCHES AND PROCESS FOR PREPARING SAME

Felix Joseph Germino, 12414 83 rd Ave., Palos Park, Ill.; Gerald Donald Miller, 3621 Douglas Road, Downers Grove, Ill., and Jerry Adam Moskaluk, 14500 Sawyer Ave., Midlothian, Ill.

Filed May 29, 1969, Ser. No. 829,083
Int. Cl. C13l *1/08*
U.S. Cl. 127—32 5 Claims

Pregelatinized starches are prepared by pasting an aqueous slurry of a starch which contains at least 50 percent amylopectin at a temperature of at least 300° F, and then rapidly, preferably instantaneously, removing the water therefrom as by roll or spray drying. The resultant products rapidly disperse in water to form smooth pastes which are characterized by low initial viscosity and minimal setback.

3,607,395

STARCH HYDROLYSIS

Alan William Stephenson, Victoria, Australia, assignor to Sidney Cooke Chemicals Pty. Ltd., Brooklyn, Victoria, Australia

Filed Nov. 19, 1968, Ser. No. 777,168
Claims priority, application Australia, Aug. 14, 1968, 42,116/68
Int. Cl. C13l *1/10*
U.S. Cl. 127—38 6 Claims

A method in which starch is hydrolysed by adding it to an acidified medium, containing from about 1 to about 5 percent by weight of mineral acid based on the weight of starch to be hydrolysed, at a temperature above about 80° C. and over a period of from about 5 to about 30 minutes, and allowing the starch to hydrolyse for a period of from about 10 to about 90 minutes thereby to produce a dextrine solution suitable for use in adhesives.

3,607,396

PROCESS FOR TREATING GRANULAR STARCH MATERIALS

Felix Joseph Germino, Palos Park; Van Deursen Harms, Homewood, and Edwin Hans Christensen, La Grange Park, all of Ill., assignors to CPC International Inc.

Filed July 16, 1968, Ser. No. 745,107
Int. Cl. C13l *1/08*, *1/06*, *1/00*
U.S. Cl. 127—71 6 Claims

Process for subjecting granular starch material, on a continuous basis, to the combined action of a solvent for the starch material and liquid that is not a solvent for the starch material, under controlled conditions, including direct heating, so as to produce controlled amounts of desired change in the granular starch material. Exemplary applications are for the continuous production of granular preswollen starch, and texturized starch.

3,607,397
METHOD OF RETARDING FOULING OF SUBSTRATE SURFACES
Larry H. Watters, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Continuation-in-part of application Ser. No. 673,964, Oct. 9, 1967, now Patent No. 3,475,217, dated Oct. 28, 1969. This application May 26, 1969, Ser. No. 827,885
Int. Cl. B08b 3/00; C23g 1/02
U.S. Cl. 134—3 12 Claims

A method of retarding the fouling of a substrate surface where the fouling is caused by exposing the said surface to amine compounds in the presence of water and carbon dioxide which comprises contacting the said surface with a mixture of a liquid chloro-substituted olefin and the said amine compound and subsequently treating the surface with an organic acid selected from at least one of the group consisting of formic acid, acetic acid and propionic acid and drying the said substrate surface. The method is particularly useful in restoring the ability of mold surfaces to release molded articles.

3,607,398
CHEMICAL STRIPPING PROCESS
Joseph G. Lucas, Trumbull, Conn., assignor to Avco Corporation, Stratford, Conn.
Filed June 18, 1969, Ser. No. 834,522
Int. Cl. B08b 3/08; C23g 1/12
U.S. Cl. 134—3 11 Claims

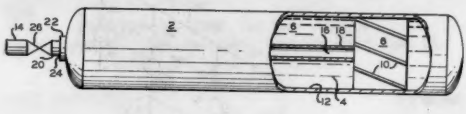
Aluminide coatings are removed without attack of the substrate by immersion of coated articles in an aqueous liquid composed of a mixture of orthophosphoric acid, nitric acid and acetic and/or chloroacetic acid. For more rapid chemical stripping, the mixture of acids should be heated.

3,607,399
METHOD AND APPARATUS FOR CLEANING SCREEN DRUMS IN TEXTILE MACHINES
Daniel Hanselmann, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland
Filed Dec. 9, 1968, Ser. No. 782,323
Claims priority, application Switzerland, Dec. 13, 1967, 17505/67
Int. Cl. B08b 9/00
U.S. Cl. 134—8 17 Claims

In one embodiment a drive roll and a finned or fluted cleaning roll are freely mounted within the interior of the screen drum to remove tangles or beards from the interior surface of the screen. In another embodiment, balls are used for the same purpose. The removed fiber material is directed to the inside free space of the screen and eliminated with the carrier airstream.

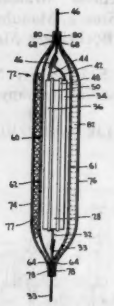
3,607,400
METHOD AND APPARATUS FOR SCRAPING THE INNER WALLS OF A VESSEL CONTAINING FLUID
Robert R. Goins, Bartlesville, Okla., assignor to Phillips Petroleum Co.
Filed May 14, 1969, Ser. No. 824,447
Int. Cl. B08b 9/00
U.S. Cl. 134—8 3 Claims

Method and apparatus for scraping the inner walls of a vessel containing fluid wherein the pressure exerted against said



inner walls is controlled by regulating the weight of an actuating shaft of the scraping means.

3,607,401
FRANGIBLE ELECTROCHEMICAL CELL
Gerald Halpert, Annandale, Va.; Joseph G. Haynos, Rockville, and Joseph M. Sherfey, Lanham, Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration
Filed May 15, 1968, Ser. No. 729,299
Int. Cl. H01m 35/32
U.S. Cl. 136—6 20 Claims



A flexible, frangible electrochemical cell and a package therefor, suitable generally for application in an atmospheric environment, is fabricated with flexible, frangible electrode plates and electrolyte containing separators sandwiched between the plates. The electrodes and the separators are secured together by electrically nonconductive fasteners, and each electrode has an expanded metal terminal. The cell housing is a flexible polymeric member having bonded outer seams, some of which are formed directly over the expanded metal terminals which partially protrude from the housing. An additional envelope or outer container may be provided to thermally insulate the cell. Such a container may be made from foamed polymeric material or flexible polymeric sheet filled with insulation.

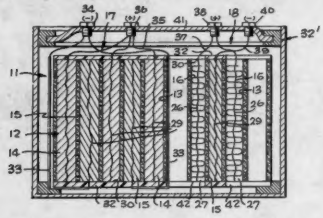
3,607,402
ELECTRICAL ENERGY STORAGE DEVICE CONTAINING A SILICON CARBIDE ELECTRODE
Edward S. Buzzelli, Solon, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio
Filed Oct. 29, 1969, Ser. No. 872,012
Int. Cl. H01m 35/02
U.S. Cl. 136—6 4 Claims

An electrical energy storage device exhibiting high energy storage capacity comprises a novel silicon carbide cathode and an aluminum-lithium alloy anode, the pair of electrodes being immersed in or in contact with a molten salt electrolyte composed of a lithium halide and one or more of the halides of the alkali metals or the alkaline earth metals or combinations thereof.

3,607,403
SELF-CHARGING BATTERY INCORPORATING A SOLID-GAS BATTERY AND STORAGE BATTERY WITHIN A HONEYCOMB MATRIX

Frank C. Arrance, Costa Mesa, Calif., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.

Filed Nov. 15, 1968, Ser. No. 776,133
Int. Cl. H01m *35/00, 27/00*
U.S. Cl. 136—6 **21 Claims**



A self-charging battery unit incorporating solid-fluid battery cell sections and high energy density storage cell sections formed within a honeycomb matrix which acts to support and separate the electrodes, the solid-fluid cell sections being actuable to charge the storage cell sections when the latter are discharged.

3,607,404
ELECTRICAL ENERGY STORAGE DEVICE CONTAINING A BORON CARBIDE ELECTRODE

Edward S. Buzzelli, Solon, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 29, 1969, Ser. No. 872,024
Int. Cl. H01m *35/02*
U.S. Cl. 136—6 **4 Claims**

An electrical energy storage device exhibiting high energy storage capacity comprises a novel boron carbide cathode and an aluminum-lithium alloy anode, the pair of electrodes being immersed in or in contact with a molten salt electrolyte composed of a lithium halide and one or more of the halides of the other alkali metals or the alkaline earth metals or combinations thereof.

3,607,405
SEALED CONTAINER FOR ELEMENTAL SODIUM

Harold A. Christopher, Scotia, N.Y., assignor to General Electric Company

Filed Mar. 27, 1969, Ser. No. 811,015
Int. Cl. H01m *1/00*
U.S. Cl. 136—20 **2 Claims**

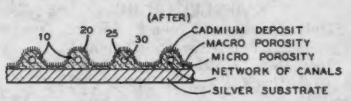
An evacuated, sealed container for pure elemental sodium is disclosed which has a casing, an ionic conducting portion in the casing, an electronic conductor in contact with the interior surface of the ionic conducting portion and extending outwardly from the casing. Such a container, when it is filled with pure elemental sodium, provides a suitable device for storing and dispensing the pure elemental sodium, or provides a sodium electrode with an associated ionic conducting electrolyte. A method is also described for forming such an evacuated, sealed container, and for filling the container with pure elemental sodium.

3,607,406
POROUS ELECTRODE PREPARATION

Nikola Marincic, Winchester, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Filed June 9, 1969, Ser. No. 831,463
Int. Cl. H01m *43/04*
U.S. Cl. 136—20 **13 Claims**

A porous electrode is prepared on a geometrical surface of desired form by employing a substrate of such desired structure, covering the substrate with a material mix of a metal or salt of a metal that is lower, or less active, on the electromotive series, and then treating such superposed structure on the substrate with a solution of a salt of a metal that is more active or higher on the activity or electromotive series, with the radical in the salt of the high-activity metal such as to form a soluble salt with the low-activity metal, whereupon, after completion of the reaction between the two salts, or metal and salt, to the extent possible with the available ingredients, the desired high-activity metal will be precipitated out of its solution to form a continuous porous structure, while the low-activity metal will be reacted into a salt, which, together with the other byproducts of the reaction, can be washed out by a suitable solvent, such as water, leaving the porous electrode form on its supporting substrate, to be used as an electrode in a battery, for example, or as a filter unit in a suitable filter, to which the structural dimensions of the porous unit will correspond by design.



3,607,407
METHOD OF PURIFYING THE ELECTROLYTE SALT EMPLOYED IN AN ELECTROCHEMICAL CELL

Harry A. Adams, Bedford Heights, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

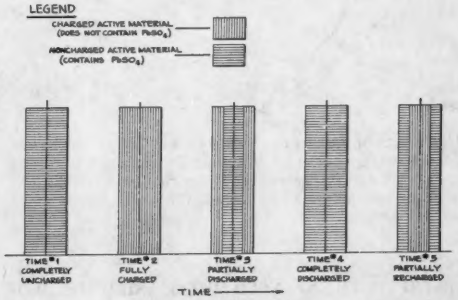
Filed Aug. 7, 1969, Ser. No. 848,219
Int. Cl. H01m *11/00*
U.S. Cl. 136—153 **5 Claims**

A process is described for increasing the energy storage capacity and cell like of an electrical energy storage device comprising a porous carbon cathode, a lithium alloy anode and a fused salt electrolyte composed of an alkali metal halide or an alkaline earth metal halide or mixtures thereof, wherein the electrolyte salt is purified electrochemically before use and is subsequently circulated to the electrochemical cell.

3,607,408
DRY-CHARGED LEAD ACID STORAGE BATTERY HAVING PARTIALLY RECHARGED ELECTRODES AND METHOD

Joseph C. Duddy, Trevose, Pa., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Nov. 5, 1969, Ser. No. 874,276
Int. Cl. H01m *39/00*
U.S. Cl. 136—26 **2 Claims**



A dry-charged lead acid storage battery has partially recharged electrodes which serve as a source of sulfate ions. An additional source of sulfate ions is also inside the battery container. In contrast to the partially or fully discharged electrodes in previous dry batteries, the electrodes of this invention are characterized by having active material in which the

percent of lead sulfate in the active material at a specified distance from the center of the electrode grid decreases as the specified distance of the material from the grid decreases. These improved electrodes are produced by being fully charged, then completely discharged, then partially recharged, and then washed and dried.

3,607,409
METHOD OF FORMING CALCIUM ZINCATE POWDER AND ELECTRODE

Robert P. Hamlen, Scotia, and John F. Wilfore, Troy, both of N.Y., assignors to General Electric Company

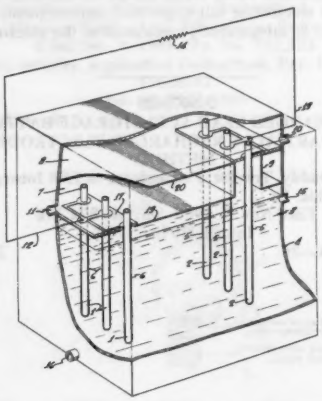
Filed June 28, 1967, Ser. No. 649,649
Int. Cl. H01m *43/02;* **C01f** *11/00;* **C01g** *9/00*
U.S. Cl. 136—30 **12 Claims**

A method of forming calcium zincate powder and an electrode from such powder comprises mixing together solutions of a soluble zinc salt and a soluble calcium salt, adding alkaline material to the mixed solution, and precipitating the calcium zincate. The liquid is decanted and the precipitate dried to provide a powder of calcium zincate with impurities of calcium hydroxide and zinc oxide. The powder contacted with a liquid, applied to a support or compacted under pressure to a particular configuration, and the powder is then dried to provide an electrode structure. Soluble zinc and calcium salts which may be employed in the method of the present invention include zinc acetate, zinc nitrate, zinc bromide, zinc chlorate, zinc perchlorate and zinc chloride, calcium acetate, calcium nitrate, calcium bromide, calcium chlorate, calcium perchlorate, calcium chloride, etc.

3,607,410
HIGH POWER DENSITY GALVANIC CELL

Carl Berger, 13401 Kootenay, Santa Ana, Calif.

Filed Nov. 6, 1967, Ser. No. 680,861
Int. Cl. H01m *13/00, 27/04*
U.S. Cl. 136—30 **23 Claims**



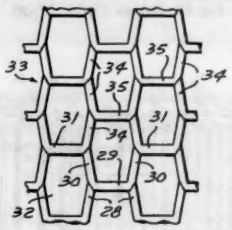
This invention relates to a novel element in galvanic cells, applicable to fuel cells and batteries. The inclusion of hollow porous capillaries increases greatly the electrode surface area in a given volume yielding substantially larger power densities than conventional systems.

3,607,411
PRESTRETCHED EXPANDED METAL AND METHOD OF MAKING IT

John A. Brownrigg, Redding Ridge, Conn., assignor to Exmet Corporation

Filed Mar. 21, 1968, Ser. No. 715,049
Int. Cl. H01m *35/04;* **B21c** *37/00*
U.S. Cl. 136—37 **13 Claims**

After production of expanded metal in substantially the usual way, sheet is stretched longitudinally until the strands in at least some of the rows become substantially longitudinally aligned. Punch may be shifted a distance equal to about one-third the tooth width to produce asymmetric



diamond-shaped openings prior to stretching. Sheet may be bent longitudinally upon itself along a row of aligned strands to yield a smooth edge. Electrode may be formed by applying a chemically active powder to sheet.

3,607,412
BATTERY PLATE GRIDS

Frank Raymond Holloway, Sutton Coldfield, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Nov. 19, 1968, Ser. No. 776,997
Claims priority, application Great Britain, Nov. 27, 1967, 53781/67
Int. Cl. H01m *35/20*
U.S. Cl. 136—66 **9 Claims**

A method of manufacturing a battery plate grid includes the steps of, placing a conductive battery plate lug having an extension integral therewith in a mould containing an impression of the battery plate grid to be produced. The remainder of the mould is then filled with particles of a synthetic resin material, and the material is heated without the application of pressure, to cause the particles of resin material to adhere to one another. The shape of said extension of the lug is such that the extension is trapped by the resin material. The grid is then removed from the mould and is rendered conductive.

3,607,413
METHOD FOR ELECTROCHEMICAL ALLOYING OF ALUMINUM AND LITHIUM

Edward S. Buzzelli, Solon, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of application Ser. No. 518,473, Jan. 3, 1966, now Patent No. 3,445,288. This application Sept. 10, 1968, Ser. No. 758,894
Int. Cl. H01m *35/30*
U.S. Cl. 136—76 **8 Claims**

Method for electrochemical alloying of aluminum and lithium by immersing a pair of electrodes, one being of aluminum, into a molten bath of lithium salt or salts, and imposing a potential to electrolyze the molten salt and drive lithium into aluminum.

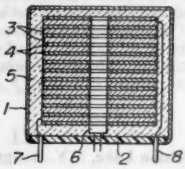
3,607,414
THERMAL BATTERY

Hiroshi Kumano, Daito-shi; Yoshimi Omukai, Hirakata-shi, and Hiroshi Yamasaki, Neyagawa-shi, all of Japan, assignors to Matsushita Electric, Industrial Co., Ltd. Oaza Kadoma, Kadoma-Shi, Osaka, Japan

Filed Dec. 16, 1968, Ser. No. 783,917
Claims priority, application Japan, Dec. 19, 1967, 42/82460
Int. Cl. H01m *21/14*
U.S. Cl. 136—83 T **6 Claims**

A thermal battery in which a salt of an oxyacid of a halogen having a valency of I, III, V or VII and an alkali

metal or alkaline earth metal is added to a depolarizer or an



electrolyte, and which has an increased discharge capacity, a flat discharge voltage and a decreased internal resistance.

3,607,415
SOLID STATE ENERGY STORAGE DEVICE

Joseph T. Kummer, Riverview, and Tseng Y. Tien, Ann Arbor, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 17, 1969, Ser. No. 877,348
Int. Cl. H01m *21/00;* **H01g** *1/00*
U.S. Cl. 136—83 **6 Claims**

A disc of sintered zirconium oxide and yttrium oxide is sandwiched between electronically and anionically conductive discs of cerium oxide. The intermediate disc consists of an electronically insulative structural lattice that contains oxygen anions capable of migrating in relationship to said lattice under the influence of an external electric field. At temperatures of about 500°–1500° C. and under the influence of such an electric field, oxygen anions travel from one side disc through the intermediate disc to the other side disc while the corresponding electrons travel through an external circuit.

3,607,416
SPINEL-TYPE ELECTRODES, PROCESS OF MAKING AND FUEL CELL

John H. Sizer, Jr., Vernon, Conn., and Jose D. Giner, Sudbury, Mass., assignors to United Aircraft Corporation, East Hartford, Conn.

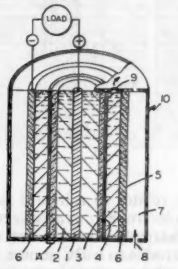
Filed Feb. 20, 1967, Ser. No. 617,073
Int. Cl. H01m *27/00, 27/04;* **C23c** *3/04*
U.S. Cl. 136—86 **14 Claims**

A process of forming a fuel cell electrode comprised of a nickel oxide-cobalt oxide spinel surface is disclosed. The process consists of first forming a nickel oxide layer on a substrate, then impregnating it with a solution of a cobalt salt and subsequently oxidizing the impregnated substrate to form the mixed oxide spinel-type electrode.

3,607,417
BATTERY CELL

Wayne A. McRae, Lexington, Mass., and John O'M. Bockris, Philadelphia, Pa., assignors to Ionics, Incorporated, Watertown, Mass.

Filed Dec. 4, 1967, Ser. No. 687,607
Int. Cl. H01m *29/04*
U.S. Cl. 136—86 **9 Claims**

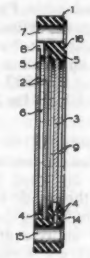


A primary and/or secondary battery cell is disclosed in which the high electrochemical capacity and high voltage obtainable from the alkali metal-oxygen system is achieved without the inherent risk of the explosively violent reaction of the alkali metal with the aqueous catholyte of the cell by interposing an ion-permeable but water-impermeable substantially insoluble laminar membrane-diaphragm between said metal and said aqueous electrolyte. The laminar membrane-diaphragm comprises a supporting microporous material such as, for example, a ceramic material which is fused or otherwise attached to a thin nonporous substantially catholyte insoluble alkali metal composition which is permeable to the alkali metal ions.

3,607,418
FUEL CELL

Alfred Ortlieb, Stuttgart-Vaihingen, and Gunter Schnepf, Stuttgart-Bad Cannstatt, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 6, 1969, Ser. No. 804,778
Claims priority, application Germany, Mar. 19, 1968, P 16 71 728.5
Int. Cl. H01m *27/02*
U.S. Cl. 136—86 R **9 Claims**



A fuel cell wherein an electrically insulating annular holder of natural or synthetic rubber comprises inwardly extending collars provided with sealing lips which engage marginal portions of disk-shaped oxygen and fuel electrodes which define between themselves oxygen and fuel chambers. The oxygen chamber receives oxygen and discharges residues through partly radial and partly axially parallel inlets and outlets of the holder. Similar inlets and outlets are provided in the holder for admission of fuel and electrolyte into and for evacuation of combustion products from the combustion chamber. The outlets and inlets are surrounded by annular sealing lips provided on one end face of the holder and arranged to abut against the other end face of an adjoining holder so that the inlets and outlets of one holder communicate with the corresponding inlets and outlets of the adjoining holder but are sealed from the atmosphere.

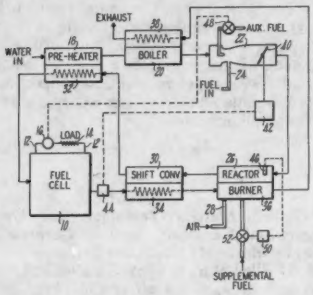
3,607,419
FUEL CELL SYSTEM CONTROL

Stephen J. Keating, Jr., West Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Oct. 1, 1969, Ser. No. 862,855
Int. Cl. H01m *27/12*
U.S. Cl. 136—86 B **2 Claims**

A fuel cell system is controlled responsive to the hydrogen partial pressure in the anode effluent and the reformer-reactor temperature. The control concerns regulating stream flow to a venturi mixer dependent upon the hydrogen partial pressure. Auxiliary fuel flow may be scheduled responsive to

abrupt changes in gross current to eliminate the time lapse normally associated with flow of fuel from the reformer to



the fuel cell. Supplemental fuel is supplied to the reformer-burner dependent upon reactor temperature.

3,607,420

PROCESS OF OPERATING FUEL-CELL HALF CELL WITH CUPRIC-CUPROUS REDOX COUPLE

Leonard H. Cutler, Philadelphia, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of application Ser. No. 609,776, Jan. 17, 1967, now abandoned. This application Nov. 17, 1969, Ser. No. 871,582

Int. Cl. H01m *27/26*

U.S. Cl. 136—86 **1 Claim**

A redox cathode system of an electrical conductor immersed in an acidic solution containing cupric chloride and excess chloride ions is disclosed for use in fuel cells. The system is isolated from the anode system by an ion-exchange membrane; and an anode having catalytic material associated therewith and an acid anolyte are employed. An organic hydrogen-containing fuel, e.g. formaldehyde, and an oxygen-containing oxidant, e.g. air and hydrogen peroxide, are preferred.

3,607,421

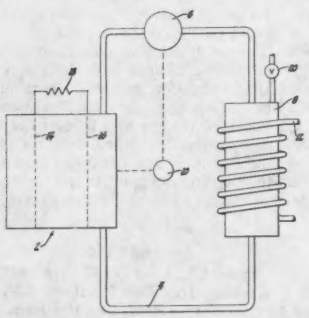
FUEL CELL GAS SUPPLY SYSTEM AND METHOD

John J. Werth, Franklin, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 31, 1968, Ser. No. 749,185

Int. Cl. H01m *27/14, 29/04*

U.S. Cl. 136—86 **9 Claims**



Chlorine is stored in a low vapor pressure condition by adsorption on activated charcoal and is continuously released from the charcoal by means of a closed loop recirculation system between the charcoal and the fuel cell. The closed loop system recirculates a quantity of chlorine in excess of that required for electrochemical consumption in the cell. The excess chlorine acts as an efficient heat transfer medium for conducting heat away from the cell and into the charcoal whereby the temperature of the charcoal is increased, more chlorine is released and the pressure in the closed loop maintained. The rate of heat transfer from the cell to the charcoal is controlled by the recirculation rate of the excess chlorine, which is, in turn, controlled by the system's pressure.

3,607,422

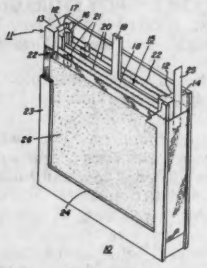
METAL-AIR CELL

Paul J. Moran, Ballston Lake, N.Y., assignor to General Electric Company

Filed Aug. 30, 1967, Ser. No. 664,367

Int. Cl. H01m *29/04*

U.S. Cl. 136—86 A **4 Claims**



A metal-air cell has a cathode, an aqueous electrolyte, a magnesium anode, and an electronically conductive porous grid positioned in contact with the electrolyte and between the cathode and the anode, and connected electrically to the cathode. A modified metal-air cell has such a porous grid connected electrically to a separate reference cathode which is in contact with both the air supply and the electrolyte.

3,607,423

RECHARGEABLE HYBRID FUEL CELLS AND METHOD OF RECHARGING

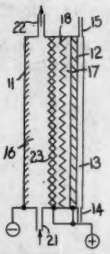
Michael Murray Bertioli, Lichfield, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Aug. 27, 1969, Ser. No. 853,432

Claims priority, application Great Britain, Aug. 27, 1968, May 13, 1969, 40825/68;24235/69

Int. Cl. H01m *27/00*

U.S. Cl. 136—86 A **4 Claims**

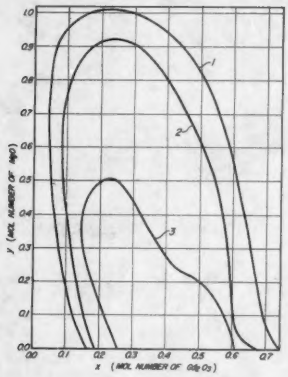


The invention relates to a hybrid fuel cell having battery plates, oxygen electrode, counterelectrode and electrolyte. Such a cell is charged by connecting the oxygen electrodes and counterelectrodes to a DC source while isolating the oxygen electrodes and counterelectrodes electrically, and the feature of the invention is that the required isolation is effected by supplying gas under pressure to the spaces between the counterelectrodes and oxygen electrodes.

3,607,424
SOLID ELECTROLYTE FUEL CELL

Yoshiyuki Maki, Fujisawa-shi; Masayuki Matsuda, Hachioji-shi, and Tetsuichi Kudo, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed June 25, 1969, Ser. No. 836,265
Claims priority, application Japan, June 28, 1968, 43/44601
Int. Cl. H01m 27/00, 13/00
U.S. Cl. 136—86 F 2 Claims

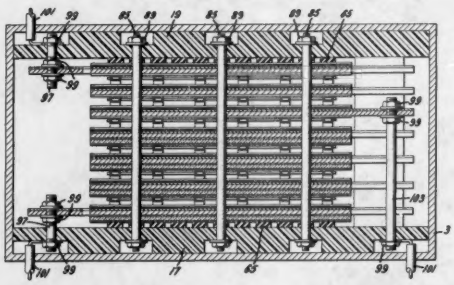


A solid electrolyte which consists of a mixture of cerium oxide and gadolinium oxide or said mixture with magnesium oxide added thereto, and which has an excellent oxygen-ion-conductive characteristic at a relatively low temperature as compared with conventional solid electrolytes.

3,607,425
FUEL BATTERY INCLUDING APPARATUS INNOVATIONS RELATING TO HEAT TRANSFER, REACTANT DISTRIBUTION, AND ELECTRICAL OUTPUT

William A. Titterington, Lynnfield; John P. Gallagher, Wilmington, and Robert W. Milgate, Jr., Marblehead, all of Mass., assignors to General Electric Company

Filed Mar. 2, 1967, Ser. No. 621,114
Int. Cl. H01m 27/00
U.S. Cl. 136—86 6 Claims

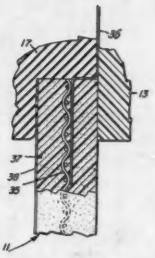


An internally tapped fuel battery which serially feeds a first group of cells between one terminal and an internal tap and a second group of cells between the internal tap and a second terminal. In addition, the external wall of the battery includes a deformable thermally conductive member to facilitate heat transfer from the battery.

3,607,426
FUEL CELL ELECTRODE

Leonard W. Niedrach, Schenectady, N.Y., assignor to General Electric Company

Filed Dec. 26, 1967, Ser. No. 693,639
Int. Cl. H01m 27/04, 13/00
U.S. Cl. 136—86 D 12 Claims

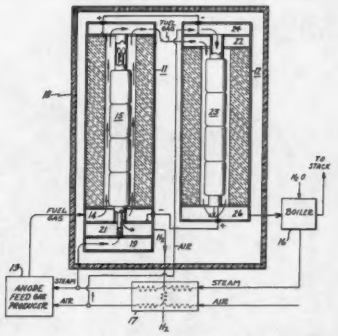


Fuel cell electrodes are composed of a mixture of catalytic and gas-adsorbing materials of a chromium-tungsten oxide and a metal selected from the class consisting of noble metals and alloys of noble metals, a current collector, and a binder bonding the materials together and to the current collector in electronically conductive relationship. An adhesive binder is employed which is not chemically attacked by the electrolyte or the reactant fluid of the cell in which the electrode is used. Such an electrode is particularly useful in a fuel cell employing a fuel containing carbon monoxide, such as reformer gas, an acid electrolyte, and under various operating conditions.

3,607,427
ELECTRICALLY COUPLED FUEL CELL AND HYDROGEN GENERATOR

Donald W. White, Burnt Hills, N.Y., assignor to General Electric Company

Filed Feb. 6, 1969, Ser. No. 797,144
Int. Cl. H01m 27/14
U.S. Cl. 136—86 4 Claims

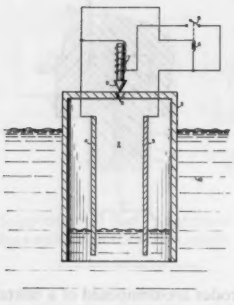


A solid oxygen-ion electrolyte fuel cell electrically coupled directly to a solid oxygen-ion electrolyte water dissociation cell (for the generation of hydrogen) is described. Hydrocarbon fuel is reacted with air and/or steam to produce a reducing gas mixture, which is admitted to the coupled cells to depolarize the anode of the dissociation cell and serve as fuel for the fuel cell. The fuel cell produces low voltage direct current useable, as produced, by the dissociation cell and, when these cells are directly coupled electrically, either cell will automatically adjust to altered operating conditions or cell characteristics of the other cell.

3,607,428
LONG LIFE REGULATED SEA WATER BATTERY

Joseph M. Marzolf, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Navy

Filed Apr. 28, 1969, Ser. No. 819,875
Int. Cl. H01m 17/00
U.S. Cl. 136—100 6 Claims

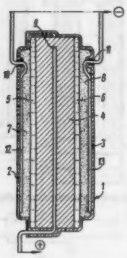


A sea water battery is housed within a container which is open to sea water at the bottom and which has a controllable valve for allowing gas to escape from the top. The opening and closing of the valve are actuated, respectively, by predetermined lower and upper battery voltage limits so as to control the amount of water within the container to thereby regulate the output voltage.

3,607,429
GALVANIC BATTERY

Meer Danilovich Kocherginsky, ulitsa Komarova 6, kv. 23; Lidia Fedorovna Penkova, 3 Mytischinskaya ulitsa, 14-a, kv. 124; Viktor Arsenievich Naumenko, Novoslobodskaya ulitsa, 62, kv. 64, and Sergei Leonidovich Kalachev, St. Kalininsky pereulok Traininskaya, 1, 6-a, all of Moscow, U.S.S.R.

Filed Oct. 25, 1968, Ser. No. 770,545
Claims priority, application U.S.S.R., Dec. 29, 1967, 1205879
Int. Cl. H01m 21/00
U.S. Cl. 136—107 7 Claims

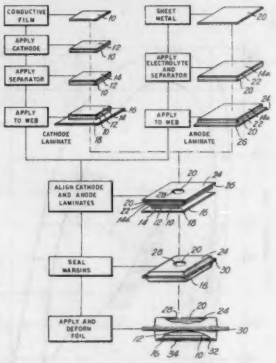


A galvanic battery, e.g. a flashlight battery, consisting of alkaline manganese dioxide-zinc cells, wherein each cell includes two shells forming a plastic casing and current collectors, the casing accommodating two zinc powder negative electrodes disposed on both sides of a positive electrode and separated therefrom by diaphragms. In each shell of the cell casing provision is made on the edge periphery for extensions which form a lap joint when assembling the cell. The cells assembled in banks are placed in a hermetic plastic film bag contained within a cellulosic outer casing of the galvanic battery.

3,607,430
MANUFACTURE OF FLAT PRIMARY GALVANIC CELLS WITH TWO HALF CELLS

Roland L. Glover, Yonkers, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Feb. 20, 1969, Ser. No. 800,906
Int. Cl. H01m 21/04
U.S. Cl. 136—111 3 Claims

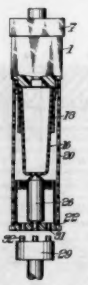


In the manufacture of thin flat primary galvanic cells a cathode laminate is formed of cathode-collector, cathodic depolarizer mix and separator and placed on a web of nonconductive plastic film. An anode laminate is formed of sheet anode metal and a second web of nonconductive plastic film. The laminates are juxtaposed with a layer of immobilized electrolyte between anode and separator and marginal portions of the two webs are heat-sealed together to finish the cell.

3,607,431
PRIMABLE ELECTROCHEMICAL GENERATOR

Maurice Garcin, Paris, and Claude Meunier, Saint-Denis, both of France, assignors to Societe Les Piles Wonder, Saint-Ouen, France

Filed Dec. 26, 1968, Ser. No. 787,092
Claims priority, application France, Dec. 28, 1967, 134088
Int. Cl. H01m 21/10
U.S. Cl. 136—114 7 Claims



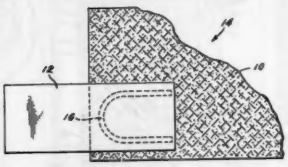
The generator comprises a recipient 1 containing the electrodes. The electrolyte is contained in a flexible bag separated from the interior of the recipient by a tearable membrane. A priming member is provided, including a piston or finger, and this priming member can be moved upward against the bag to fold the bag on itself, which first tears the tearable membrane and then displaces the electrolyte from the bag into the recipient.

3,607,432

BATTERY ELECTRODE HAVING A LEAD ATTACHED THERETO AND METHOD OF MAKING SAME

Keith N. Johnson, Cumberland, R.I., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 16, 1967, Ser. No. 683,494
Int. Cl. H01m *13/00*
U.S. Cl. 136—120 R 13 Claims



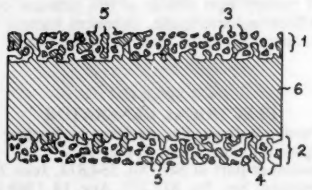
A porous battery plate comprising nickel metal powder sintered to nickel metal mesh and having an electrochemically active material such as cadmium hydroxide impregnated therein is shown to be secured to a nickel lead member for use in electrically connecting the plate as an electrode in an alkaline electrolyte battery or the like by inserting a nickel-plated nickel wire between portions of the lead member and plate and by welding the lead member to the plate by electrical resistance welding, the nickel wire plating embodying a phosphor constituent or the like such as is inherently deposited therein during formation of the plating by electroless nickel-plating techniques for lowering the melting temperature of the nickel plating below the melting temperature of the nickel lead member, the plated nickel wire serving as a weld projection for securing the lead member to the plate.

3,607,433

METHOD OF PREPARATION OF ELECTRODES FOR GALVANIC HIGH-TEMPERATURE FUEL CELLS HAVING SOLID ELECTROLYTES

Arnold Isenberg, Neu-Isenburg II; Wilfried Pabst, Frankfurt am Main, and Gerd Sandstede, Frankfurt am Main, all of Germany, assignors to Aktiengesellschaft Brown, Boveri & Cie., Baden, Switzerland

Filed Feb. 28, 1967, Ser. No. 619,431
Claims priority, application Germany, Mar. 11, 1966, B86169
Int. Cl. H01m *13/00*
U.S. Cl. 136—120 FC 4 Claims



A method for the preparation of electrodes for galvanic fuel cells having solid porous surfaced electrolytes conducting ions, these cells operating at high temperatures and having electrodes made of metals and/or conductive oxides, wherein oxides are selected as starting materials and these are then connected to the porous surface of the electrolyte at high temperature either in a solid-solid or liquid-solid reaction. In one embodiment of the method, copper in powder form is applied to the porous surface of the electrolyte and heated in air to the fusion point causing infusion thereof in the form of copper oxide. The copper oxide can then be reduced immediately to form the metal or such reduction can be permitted to take place later in the cell under the influence of the hydrogen gas used in the cell. In another embodiment of the method, utilized when the oxides have a high melting point, the porous surface of the solid electrolyte is impregnated several times with a metallic salt solution such as a nickel nitrate solution and roasted after each such impregnation at a temperature of 500° C. to establish the oxide. This oxide is thereafter reacted with the solid electrolyte by further heat treatment at a temperature of 1800° C. to produce the electrode.

3,607,434

ELECTRIC STORAGE BATTERY INTERCELL CONNECTORS

Brian Robert Allen, Bournville, and Kenneth George Blandford, Solihull, both of England, assignors to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Sept. 22, 1969, Ser. No. 859,742
Claims priority, application Great Britain, Sept. 30, 1968, 46263/68
Int. Cl. H01m *13/10*
U.S. Cl. 136—134 R 2 Claims

An electric storage battery of the type in which adjacent cells are connected through intercell connectors extending through the cell wall having an additional connector integral with or secured to one of the intercell connectors by resistance welding, the additional connector having a portion extending along one of the sidewalls of the battery box and connected through that sidewall with an external terminal to provide an additional voltage tapping from the battery.

3,607,435

METHOD OF MAKING SINTERED BETA-ALUMINA BODIES

Richard J. Charles, Schenectady; Stephan P. Mitoff, Elnora, and William G. Morris, Schenectady, all of N.Y., assignors to General Electric Company

Filed Dec. 17, 1969, Ser. No. 885,960
Int. Cl. H01m *41/02*
U.S. Cl. 136—153 9 Claims

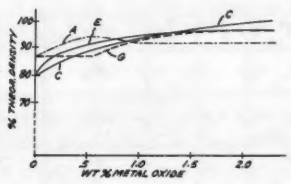
Sintered beta-alumina bodies specially suited for use as solid electrolytes are prepared through the use of alpha-alumina with sodium meta-aluminate as a binder for the formation of green bodies of good strength and as a source of sodium oxide for reaction with the alpha-alumina to produce sodium beta-alumina during the sintering operation.

3,607,436

SINTERED BETA-ALUMINA BODIES AND METHOD

Richard J. Charles, Schenectady; William J. Dondalski, Schenectady, and Stephan P. Mitoff, Elnora, all of N.Y., assignors to General Electric Company

Filed Dec. 17, 1969, Ser. No. 885,698
Int. Cl. H01m *41/02*
U.S. Cl. 136—153 8 Claims



The electrical conductivity of a sintered sodium beta-alumina solid electrolyte can be increased substantially by incorporating small proportions of magnesia and yttria in the powder mixture used to produce the sintered body.

3,607,437

ELECTROLYTE FOR USE IN ALKALINE STORAGE BATTERIES HAVING A ZINC NEGATIVE ELECTRODE

Shigekazu Minagawa, Tokyo; Hideo Takahashi, Higashimurayama-shi; Kenzo Ito, Hachioji-shi; Tetsuo Gejyo, Tokyo, and Yoshiyuki Maki, Fujisawa-shi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 11, 1969, Ser. No. 806,253
Claims priority, application Japan, Mar. 15, 1968, 43/16488
Int. Cl. H01m *41/02*
U.S. Cl. 136—154 6 Claims

An electrolyte most suitable for use in alkaline storage batteries having a zinc negative electrode, which consists of an aqueous solution of alkali metal hydroxide with zinc or a zinc compound and a small quantity of a stannous compound dissolved therein, and which is capable of preventing the growth of zinc dendrites during charging of the batteries.

3,607,438

PENTACYANOCOBALTATE ELECTROLYTES FOR FUEL CELLS

Thomas H. Coffield, Orchard Lake, Mich., assignor to Ethyl Corp., New York, N.Y.

Division of Ser. No. 715,528, Mar. 3, 1968, Pat. No. 3,530,004. Filed Aug. 6, 1969, Ser. No. 848091
Int. Cl. H01m *11/00, 27/00*
U.S. Cl. 136—154 3 Claims

Alkali metal, alkaline earth metal, and ammonium pentacyanocobaltate solutions are efficacious electrolytes for fuel cells.

3,607,439

MINATURE BATTERY OR POWER CELL CONTAINERS

Eugene A. Lilley, Alton, Ill., assignor to Olin Mathieson Chemical Corporation

Filed July 2, 1969, Ser. No. 848,376
Int. Cl. H01m *1/00*
U.S. Cl. 136—166 6 Claims

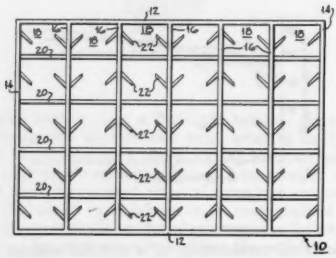
A battery or power cell container comprising an iron base alloy component, a copper base alloy component containing an alloying substituent selected from the group consisting of 0.5 to 5.0 percent iron, 0.5 to 2.0 percent cobalt and mixtures thereof, balance essentially copper, bonded to a side of said iron base alloy component and an additional alloy component selected from the group consisting of the brasses, cupro-nickels, and nickel-silvers bonded to the opposite side of said iron base alloy component, and the method of producing said container.

3,607,440

BATTERY CONTAINER HAVING SPRINGLIKE PACKING RIBS TO ACCOMMODATE ELEMENTS OF VARYING THICKNESSES

Fred P. Daniel, North Olmsted, and Eugene W. Mossford, Novelty, both of Ohio, assignors to ESB Incorporated

Filed Jan. 29, 1970, Ser. No. 6,768
Int. Cl. H01m *1/02*
U.S. Cl. 136—166 10 Claims



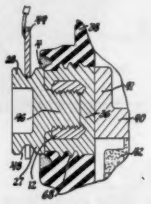
Springlike packing ribs integrally molded with the walls of a battery container permit a single container to accommodate elements of varying thicknesses, thus reducing the number of different sizes of containers and container molds required for battery manufacturing.

3,607,441

PROCESS FOR MAKING BATTERY TERMINALS

Renard E. Mix, Yorktown, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 24, 1969, Ser. No. 879,379
Int. Cl. H01m *5/00*
U.S. Cl. 136—176 9 Claims



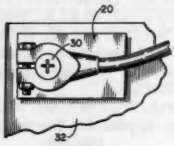
A method of making a storage battery in which a terminal and a terminal-carrier are molded about a hollow core of hard metal. The terminal-carrier is molded into the core at the beginning of the process, used to facilitate handling of the terminal during processing, and discarded after the terminal is joined to the battery.

3,607,442

BATTERY WITH GALVANIC TERMINAL POST PROTECTOR

Harvey J. Hall, 1730 Steele Blvd., Baton Rouge, La.

Filed May 12, 1969, Ser. No. 823,752
Int. Cl. H01m *5/02*
U.S. Cl. 136—181 10 Claims



Means for improving the performance characteristics of acid batteries are described. Use of particular metallic shields to ward off battery acid attack of the terminal connection lengthens effective battery life, enhances battery reliability and reduces corrosion of the terminal connection.

3,607,443

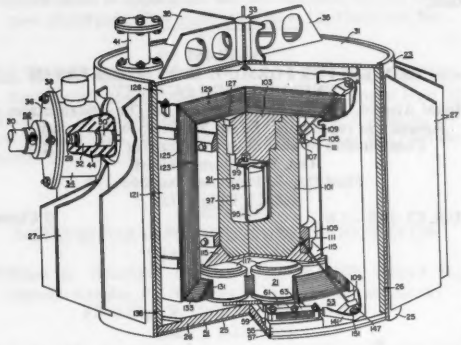
ELECTRICAL GENERATOR

David L. Purdy, Indiana, Pa., assignor to Nuclear Materials and Equipment Corporation, Apollo, Pa.

Continuation-in-part of Ser. No. 554,874, June 2, 1966, abandoned, Ser. No. 817,271, Apr. 14, 1969 is a continuation of said Ser. No. 554,874. This application Sept. 23, 1966, Ser. No. 581,506
Int. Cl. G21h *1/10*; H01v *1/30*
U.S. Cl. 136—202 10 Claims

A radioactive thermoelectric generator is disclosed. The radioactive fuel is enclosed within a biological shield of tungsten to which a heat-transfer saddle is brazed. The thermoelectric converter includes modules with heat-transfer plates which are diffusion bonded to the shield so that the heat transfer to the hot junctions of the modules is through a metallurgical joint. The shield, fuel and thermoelectric converter are enclosed within an evacuated container in a heat

shield of sheets of titanium nearer the biological shield and aluminum more remotely. Each module is enclosed in a



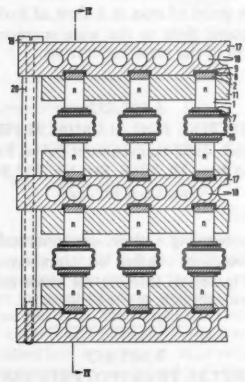
second container within the evacuated container. The second container has gas at a substantial pressure to protect the thermoelectric elements.

3,607,444

THERMOELECTRIC ASSEMBLY

Eugen Szabo DeBucs, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Dec. 5, 1967, Ser. No. 688,050
Claims priority, application Germany, Dec. 6, 1966, S 107279
Int. Cl. H01v *1/30*
U.S. Cl. 136—208 **8 Claims**



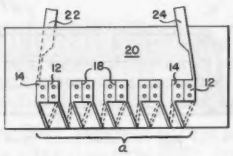
Thermoelectric assembly includes a plurality of *p* and *n*-conductive thermocouple element legs, a plurality of contact bridges electrically interconnecting the thermocouple element legs and forming therewith a hot and cold side on opposite sides thereof, and a pair of heat exchangers located respectively on the opposite sides of the legs, at least one of the heat exchangers comprising a tube defining a flow channel for a fluid heat-exchanging medium, the tube being formed of heat-conductive material elastically deformable in a direction transversely to the axis of the tube and in the axial direction of the thermocouple element legs.

3,607,445

THERMAL APPARATUS

Frank F. Hines, Litchfield, N.H., assignor to RdF Corporation, Hudson, N.H.

Filed Feb. 19, 1968, Ser. No. 706,585
Int. Cl. H01v *1/02*
U.S. Cl. 136—225 **3 Claims**



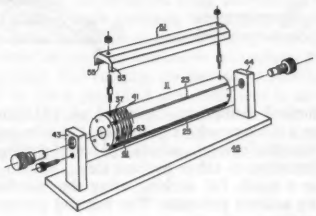
A thermal apparatus having *n*, unitary, planar, thermoelectric elements arranged to produce *n*−1 thermoelectric junctions where the number of elements "*n*" is an odd number of five or more. The thermoelectric junctions can be arranged in series, parallel, or combinational configurations. Various geometries are used to produce substantially planar thermopiles having a very high junction density per unit area.

3,607,446

THERMOPILE AND METHOD OF MAKING

Alfred Sugarman, Monroeville; Han Chang, Apollo, and Alvin H. Kasberg, Murrysville, all of Pa., assignors to Nuclear Materials and Equipment Corporation, Apollo, Pa.

Filed Nov. 6, 1967, Ser. No. 680,895
Int. Cl. H01v *1/00*
U.S. Cl. 136—226 **9 Claims**



Method of making a thermopile 61 composed of a large number of wire elements in whose practice continuous wires **37** and **41** of dissimilar thermoelectric material are lapped in opposite directions. The wires form an array of regions of intersection. An electric arc is passed along this array while the portions of the wires near the intersection are cooled. The arc produces welded joints **58, 59** and at the same time separates the wires at the joints from the continuum of wire to produce thermocouples **63.** A thermopile assembly **80** formed by embedding the wires in insulating sheets **71, 73** before they are welded and wrapping the sheet with the wires in them in a cylinder **91.** Apparatus for making the thermopile including a mandrel **11** with opposite running helical grooves **13, 15, 17, 19** for winding the wires **37, 41,** channels **13, 25, 27, 29** along the arrays of intersection of the wires and chill blocks **51** for engaging the wires near their array of intersections to cool them.

3,607,447

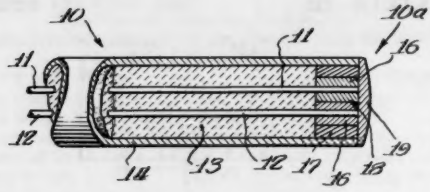
NONWELDED THERMOCOUPLE JUNCTIONS

Bayard C. Davis, 425 South Grace St., Lombard, Ill., and Alvin Singer, 1125 Honlkelder Road, Glencoe, Ill.

Continuation of application Ser. No. 769,560, Oct. 22, 1968, now Patent No. 3,538,596, which is a division of application Ser. No. 475,495, July 28, 1965, now abandoned. This application Apr. 16, 1970, Ser. No. 29,134
Int. Cl. H01v *1/02*
U.S. Cl. 136—233 **11 Claims**

A nonwelded thermocouple assembly specifically adapted for use in a high temperature environment is disclosed. The

thermocouple wires are of a refractory metal composition including at least one metal selected from the group consisting of tungsten, rhenium and molybdenum. The wires extend through a refractory metal sheath and are supported in spaced relation therewithin by a refractory insulating material. The ends of the thermocouple wires are received in apertures in an end plug and the plug is swaged about the wires to effect an exclusively mechanically bonded junction. An end closure cap for the sheath completes the assembly Three embodiments and other features are disclosed.



3,607,448

CHEMICAL MILLING OF SILICON CARBIDE

Howard L. Dunlap, Granada Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 21, 1968, Ser. No. 769,013
Int. Cl. H01l *7/50*
U.S. Cl. 148—1.5 **13 Claims**

The method comprises the steps of (1) placing molybdenum on a silicon carbide specimen, (2) alloying the molybdenum into the silicon carbide, (3) performing, if desired, ion implantation or other process steps, utilizing the molybdenum as a mask, (4) etching away the molybdenum alloy such as by sodium peroxide. The method permits the use of low temperature operations.

3,607,449

METHOD OF FORMING A JUNCTION BY ION IMPLANTATION

Takashi Tokuyama, Hoya-shi; Takao Miyazaki, Hachioji-shi; Takashi Tsuchimoto, Kodaira-shi; Tadahisa Morita, Mitaka-shi; Takahide Ikeda, Kokubunji-shi; Shigeru Nishimatsu, Tokyo; Hisumi Sano, Tokyo, and Masatada Horiuchi, Koganei-shi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sept. 23, 1969, Ser. No. 860,303
Claims priority, application Japan, Sept. 30, 1968, 43/70131
Int. Cl. H01l *7/54*
U.S. Cl. 148—1.5 **10 Claims**

Disclosed is a method of forming a PN junction comprising the steps of implanting impurity ions into an insulating layer formed on the surface of a semiconductor substrate and then diffusing the implanted impurity ions into the surface layer of the semiconductor substrate thereunder.

3,607,450

LEAD SULFIDE ION IMPLANTATION MASK

David A. Kiewit, Santa Monica, Calif., assignor to The United States of America as represented by the Secretary of the Air Force

Filed Sept. 26, 1969, Ser. No. 861,388
Int. Cl. H01l *7/54*
U.S. Cl. 148—1.5 **1 Claim**

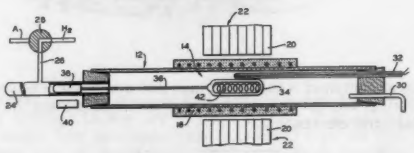
A method for masking semiconductor bodies during the ion beam implantation of contaminants into preselected portions of a semiconductor material. The method involves the deposition of a lead sulfide film onto the surface portion of a semiconductor material and the formation of the film into a mask through the use of conventional photoresist and chemical etching techniques. The lead sulfide masked semiconductor body can then be subjected to an ion implantation operation.

3,607,451

PROCESS FOR FORMING IRON WHISKERS OF UNIFORM HIGH QUALITY

Iqbal Ahmad, Elnora, N.Y., assignor to The United States of America as represented by the Secretary of the Army

Continuation-in-part of application Ser. No. 673,224, Oct. 5, 1967 abandoned.
Filed Oct. 8, 1969, Ser. No. 868,274
Int. Cl. B01j *17/32*
U.S. Cl. 148—1.6 **9 Claims**



This invention provides a process for growing single, uniaxial crystals of iron having uniform physical properties, the process consisting essentially of placing an iron halide in a boat, heating the boat and its contents to a temperature below the Curie point of iron in a flow of hydrogen gas and applying a magnetic field to the zone surrounding the boat during the growth of the resulting crystals.

3,607,452

COLOR COATING FOR ALUMINUM PRODUCTS

Michael N. Marosi, 4153 Hayvenhurst Drive, Encino, Calif.

Filed June 19, 1968, Ser. No. 737,863
Int. Cl. C23f *7/26*
U.S. Cl. 148—6.2 **16 Claims**

A process for forming a clear, unpigmented colored acryloid plastic protective coating on aluminum surfaces; the composition of materials forming the color coating; and the coated aluminum products of the process.

3,607,453

METAL TREATING PROCESS

Rolf Engesser, Frankfurt, am Main; Richard Tuch, Frankfurt am Main, and Winfried Menzer, Sprendingen-Hirschsprung, all of Germany, assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Oct. 2, 1969, Ser. No. 863,326
Int. Cl. C23f *7/10*
U.S. Cl. 148—6.15 Z **6 Claims**

A process for phosphating iron and steel by treating it with a peroxide accelerated zinc phosphate solution. The phosphating solution used contains zinc, P_2O_5, H_2O_2, B_2O_3 and NO_3. The desired amounts and ratios of these components are maintained in the solution by the controlled addition of zinc, P_2O_5, NO_3(as HNO_3)and sodium perborate.

3,607,454

PAINT COMPOSITION FOR RUSTY METALS AND METHOD THEREFOR

Hans Dulliken Heiz, Bruggliacker, Switzerland, assignor to H. R. Schlatter, Kusnacht-ZH, Switzerland

Continuation of application Ser. No. 591,991, Nov. 4, 1966, now abandoned. This application Nov. 14, 1969, Ser. No. 871,571

Int. Cl. C23f 7/10

U.S. Cl. 148—6.15 R 12 Claims

An aqueous film-forming composition including at least 20 percent by weight phosphoric acid is applied to a rusted ferrous metal surface to chemically modify the rust and bind the modified rust to the metal.

3,607,455

METHOD FOR IMPROVING PAINT ADHESION ON STAINLESS STEEL

William G. Renshaw, deceased, late of 1508 Second St., Natrona Heights, Pa. (by Bernice M. Renshaw, executrix)

Filed Sept. 9, 1968, Ser. No. 759,820

Int. Cl. C23f 7/26

U.S. Cl. 148—6.16 6 Claims

This invention relates to a method for treating the surface of stainless steel to improve the adhesion of paints and lacquers applied thereto. An aqueous solution of trisodium phosphate is applied to the stainless steel followed by rinsing and thereafter applying a hot aqueous solution of sodium dichromate and calcium fluoride and again rinsing.

3,607,456

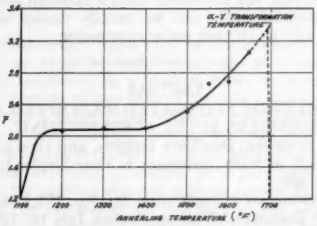
DEEP DRAWING STEEL AND METHOD OF MANUFACTURE

James L. Forand, Jr., Bethlehem, Pa., assignor to Bethlehem Steel Corporation

Filed Apr. 15, 1969, Ser. No. 816,239

Int. Cl. C21d 9/48

U.S. Cl. 148—12 5 Claims



A ferrous metal sheet having an *r* in the range of 2.5 to 3.3 and an ASTM grain size of 6.0 to 9.0 is produced by hot rolling to intermediate gauge strip ferrous metal containing 0.15 to 0.30 wt. percent titanium and small amounts of oxygen, carbon and nitrogen, the weight ratio of the titanium to the sum of the carbon and nitrogen being a minimum of 7:1. The steel is finished hot, coiled cold, cold reduced and batch annealed at temperatures approaching the alpha-gamma transformation temperature.

3,607,457

METHOD OF MANUFACTURING A ROTARY SCANNING PRISM

Bengt Olov Hagg, and Tore Bertil Reinhold Olsson, both of Karlskoga, Sweden, assignors to Aktiebolaget Bofors, Bofors, Sweden

Division of Ser. No. 693,003, Dec. 22, 1967. Filed May 29, 1969, Ser. No. 831,820

Int. Cl. C21d 9/00; C23f 17/00

U.S. Cl. 148—12.1 11 Claims

A method of producing a light-reflecting prism such as a mirror prism of equilateral polygonal cross section for image scanning by high speed rotation of the prism about its center axis by tempering and aging a steel blank. The blank is then machined to size and the sidewalls of the steel block thus obtained are coated with a highly light-reflecting metal such as gold.

3,607,458

WELDABLE AND WEAR RESISTANT MAGNETIC FERRITIC MALLEABLE IRON AND METHOD

Oral K. Hunsaker, and Bruce R. Shue, both of Dayton, Ohio, assignors to The Dayton Malleable Iron Company, Dayton, Ohio

Filed May 13, 1968, Ser. No. 728,807

Int. Cl. C21d 5/10; C22c 37/02, 37/04

U.S. Cl. 148—16 12 Claims

Weldable and magnetic ferritic malleable iron castings having an improved abrasion resistant wear layer, and the method of forming such castings are described. The casing includes a body portion of full ferritic malleable iron which is covered with several zoned layers, viz., a pearlitic type matrix of broken spheroidized martensite which is partially depleted of carbon nodules, a decarburized wear layer of finely dispersed well distributed spheroidized carbides in a ferritic matrix which provides a good weld zone and an outer intergranular oxidation layer. In machining castings to be used for abrasion resistance the outer two layers and a portion of the wear layer are removed to expose the abrasion resistant wear layer. In the case of a casting to be welded, the outer layer and a portion of the weldable layer are removed. By controlling the structure of the casting between the fully ferritic body and the wear layer, high magnetic permeability and low magnetic remanance are obtained while providing a weldable casting. In forming such castings, white iron of malleable composition is annealed in a decarburizing atmosphere in which the ratio of carbon monoxide to carbon dioxide is closely controlled. The castings are heated to between 1800° F. and 1975° F. for a period of time sufficient to decompose the cementite followed by cooling to 1400° F. to 1650° F., and quenching or air colling, and tempering. Various details of the annealing and tempering cycles are described.

3,607,459

QUENCH HARDENING OF METALS WITH IMPROVED QUENCHING MEDIUM ADDITIVE

Bill Mitacek, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Oct. 9, 1968, Ser. No. 766,315

Int. Cl. C21d 1/58

U.S. Cl. 148—18 9 Claims

Metals are quench hardened by being heated above the critical temperature and then immersed in a quenching medium containing a calcium petroleum sulfonate having a base number less than 15 and prepared by sulfonating one part by weight of a propane-fractionated, solvent-extracted, dewaxed intermediate base bright stock having a viscosity of about 200 to 230 SUS at 210° F. and a viscosity index of at least about 85 with a quantity of sulfonating agent consisting essentially of liquid SO_3 dissolved in an inorganic solvent equivalent to from about 0.1 to about 1 part by weight of 20 percent fuming sulfuric acid, at a temperature in the range of about 50° to 200° F.; neutralizing the resulting reaction mixture with at least the minimum required for neutralization of an aqueous slurry of calcium hydroxide; heating the resulting mixture in the liquid phase at a temperature of about 360° to 400° F. for about 10 minutes; and removing water and inorganic solids therefrom to obtain calcium petroleum sulfonate product containing not more than 6 weight percent sulfated ash. This calcium petroleum sulfonate product can be used directly to supply the calcium petroleum sulfonate or the calcium petroleum sulfonate can be extracted from this product and utilized in a more purified form.

3,607,460

FIRST ORDER TRANSITION FILMS FOR MAGNETIC RECORDING AND METHOD OF FORMING

James M. Lommel, Schenectady, N.Y., assignor to General Electric Company

Filed Nov. 18, 1968, Ser. No. 776,619
Int. Cl. H01f 10/00, 1/14
U.S. Cl. 148—31.55 8 Claims

Thin films of iron-rhodium exhibiting a broadly hysteretic first order transition between the ferromagnetic and antiferromagnetic states are produced by sequentially depositing iron and rhodium films upon a refractory substrate at a pressure in the range of 1×10^{16} torr, annealing the structure in a vacuum of 1×10^{16} torr at a temperature of approximately 700° C. for 1 hour to produce a complete diffusion of the iron and rhodium layers, and subsequently subjecting the diffused layers to a second anneal in an atmosphere greater than 10 parts per million oxygen in a thermal cycle that includes slowly heating the structure to 400° C., maintaining the 400° C. for approximately 10 minutes and slowly cooling to room temperature. Films thus formed are advantageously employed in the recording of digital information by electron beam heating individual regions through a first order transition to the ferromagnetic state whereupon the regions are permitted to cool to a biasing temperature slightly higher than the temperature of transition back to an antiferromagnetic state. A magnetic field then is applied to the entire film to magnetize only those regions of the film in the ferromagnetic state and readout of the recorded information can be achieved by conventional electron beam microscopy. The ferromagnetism of the film subsequently can be erased by cooling the film below the transition temperature to the antiferromagnetic state or by the application of a strain to the film.

3,607,461

HOT WORKABILITY OF AUSTENITIC STAINLESS STEEL ALLOYS

Delmar O. Stanley, and John F. Kocis, both of Mentor, Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Dec. 18, 1967, Ser. No. 691,187
Int. Cl. C22c 39/20, 39/54
U.S. Cl. 148—38 2 Claims

Improving the hot workability of austenitic stainless steel alloys by first providing a cast slug with a controlled microstructure, usually by inoculation of the molten material with a metal such as titanium to produce a generally equiaxed structure, followed by forging of the cast slug into the desired shape.

3,607,462

PROCESS OF MAGNETIC PARTICLE PREPARATION

Alfred M. Laing, Butler, Pa., assignor to Spang Industries, Inc.

Filed Mar. 21, 1968, Ser. No. 714,805
Int. Cl. H01f 1/24
U.S. Cl. 148—104 11 Claims

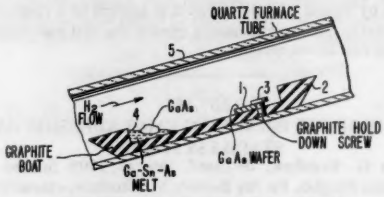
Magnetic particle cores suitable for phase shifting applications having a permeability substantially above 275 and core losses below 0.24 ohms per henry per unit of inductance at 1,800 Hertz are produced by a novel combination of steps including one or more of the following: reduction of prepowder anneal additives, selective distribution of magnetic particle sizes, adding flexibility to the electrical insulation applied to the magnetic particles, elevated pressure compacting, surface etching of the pressure compacted core after hydrogen anneal, and an oxidation heat treatment following surface etching. Surface etching and oxidation combine to increase the breakstrength and improve other properties of various permeability cores, for example, from 125 through 300 permeability.

3,607,463

METHOD FOR GROWING TIN-DOPED N-TYPE EPITAXIAL GALLIUM ARSENIDE FROM THE LIQUID STATE

Joshyo Kinoshita, Santa Clara, and William W. Stein, Palo Alto, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Aug. 2, 1968, Ser. No. 749,777
Int. Cl. H01l 7/38
U.S. Cl. 148—171 5 Claims



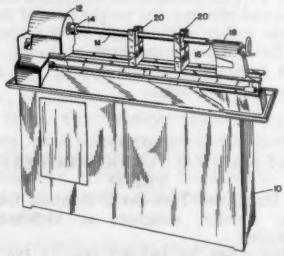
A charge consisting of gallium, gallium arsenide, and tin was heated to produce a liquid molten solution of gallium, arsenic, and tin with the atom fraction of tin being below 80 percent in the solution. The charge and a gallium arsenide substance are preferably heated in a refractory boat contained within a hydrogen furnace tube, such boat being tilted at an angle such that the substrate wafer is above the liquid level of the solution. The boat is then tipped to cover the heated surface of the gallium arsenide substrate member with the liquified charge solution. The furnace is then allowed to cool, resulting in an epitaxial growth of tin-doped N-type gallium arsenide upon the gallium arsenide substrate member. Growth of the epitaxial layer occurs within a few minutes, after which the excess charge is scraped from the layer and the substrate member and is then treated with a solution of molten tin bromide to facilitate removal of the excess tin and gallium. The tin bromide and excess tin and gallium are removed from the epitaxial surface by treatment with hydrochloric acid. By varying the atom fraction of tin in the liquified solution, the net donor carrier concentration in the resultant epitaxial layer can be readily varied within the range from 10^{16} to 10^{18} per cubic centimeter.

3,607,464

TREATMENT OF ELONGATED HIGH SPEED STEEL MEMBERS AFTER AUSTENITIZING

Richard F. Erxleben, Dearborn Heights, and Orie I. Causley, Fraser, both of Mich., assignors to Lear Siegler Inc., Santa Monica, Calif.

Continuation-in-part of application Ser. No. 552,944, May 25, 1968, now abandoned. This application July 10, 1968, Ser. No. 761,365
Int. Cl. C21d 1/00, 9/28
U.S. Cl. 148—153 18 Claims



Elongated members formed of tool steel are maintained straight by sets of aligned rollers during cooling in air through the hardening range between 600° F. and room tem-

perature following cooling after heating throughout to austenitizing temperature. Cooling throughout the hardening range is accelerated by blowing air on the member.

3,607,465

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE COMPRISING A ZENER DIODE AND SEMICONDUCTOR DEVICE MANUFACTURED BY SAID METHOD

Jean-claude Frouin, Defense Passive Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 28, 1968, Ser. No. 740,943
Claims priority, application France, June 30, 1967, 112630
Int. Cl. H01l 7/36
U.S. Cl. 148—175 **9 Claims**

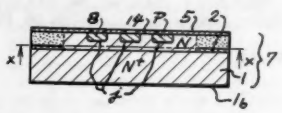
A method of making in a monolithic integrated semiconductor circuit a Zener diode having a reverse breakdown voltage in the range of 2.5–6 volts is described. This is obtained by constructing one of the diode zones as a heavily doped buried layer and the other diode zone as a heavily doped surface layer and out-diffusing the former and in-diffusing the latter until they meet to form an abrupt junction having the desired characteristics. A heavily doped surface contact region is diffused down to the buried zone to make available a surface contact for the latter.

3,607,466

METHOD OF MAKING SEMICONDUCTOR WAFER

Masayoshi Miyazaki, Kanagawa-ken, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 21, 1968, Ser. No. 777,619
Claims priority, application Japan, Nov. 22, 1967, 42/75053/67
Int. Cl. H01l 7/36, 5/00; C23c 13/00
U.S. Cl. 148—175 **6 Claims**



A semiconductor wafer may be made extremely thin, for example, so as to be suitable for use as a solid target of enhanced sensitivity in a vidicon tube, by forming on the marginal portion of one side of a single crystal semiconductor substrate a seeding site which is crystallographically different from the substrate, coating that one side of the substrate with a vapor growth layer of the same conductivity type as the substrate to consist of a polycrystalline region overlying the seeding site and a single crystal region directly overlying the remainder of that side of the substrate, and then removing the semiconductor substrate from the vapor growth layer, as by grinding, to leave a semiconductor wafer of a thickness substantially determined by the thickness of the vapor growth layer and in which cracks that may originate at the edge of wafer, either during grinding or otherwise, are blocked from spreading into the single crystal region at the boundary of the latter with the marginal polycrystalline region. The semiconductor substrate is preferably of a high impurity type so that the concentration of impurity in the single crystal region of the semiconductor wafer produced as aforesaid increases across the thickness of the wafer in the direction toward the surface thereof from which the substrate has been removed.

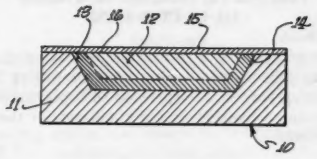
3,607,467

METHOD FOR FABRICATING AN ALLOYED SEMICONDUCTOR DEVICE

King Lau Hu, Torrance, Calif., assignor to TRW Semiconductors Inc., Los Angeles, Calif.

Filed June 2, 1969, Ser. No. 829,509
Int. Cl. H01l 7/46
U.S. Cl. 148—181 **10 Claims**

An improved method for the fabrication of an alloyed semiconductor device. A silicon crystal of a first type conductivity is provided. A region of a metal for producing a second type conductivity is alloyed into a portion of the silicon crystal establishing a PN junction. Prior to heating the crystal to establish the desired device characteristics, a layer



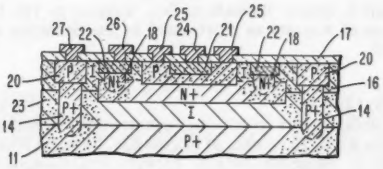
of oxide is disposed upon the surface of the crystal whereon the junction is exposed. Upon heating, the oxide combines with the passivating layer on the silicon crystal forming a glass encapsulating member which will prevent the crystal from cracking when the device is cooled by quenching.

3,607,468

METHOD OF FORMING SHALLOW JUNCTION SEMICONDUCTOR DEVICES

Joseph J.F. Chang, Poughkeepsie, and Madhukar B. Vora, Beacon, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 7, 1968, Ser. No. 765,328
Int. Cl. H01l 7/44
U.S. Cl. 148—186 **5 Claims**



A method for making a high-performance NPN silicon semiconductor device which has an arsenic emitter which gives a substantial improvement in transistor speed and current gain over similar phosphorous emitters. Arsenic atoms in the emitter region tend to squeeze the P-type impurity, such as boron in the base into a narrow base layer. For the same integrated base doping, a much narrower base can be obtained with arsenic-doped emitters than with phosphorous-doped emitters.

3,607,469

METHOD OF OBTAINING LOW CONCENTRATION IMPURITY PREDEPOSITION ON A SEMICONDUCTIVE WAFER

Lee P. Madden, Sunnyvale, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Mar. 27, 1969, Ser. No. 811,116
Int. Cl. H01l 7/34
U.S. Cl. 148—186 **18 Claims**

A method for predepositing very low concentrations of impurity on a semiconductive wafer essentially comprising the steps of immersing the wafer in a nonoxidizing acid solution to remove the oxide from predetermined surface areas of the chip to render those areas highly reactive, and immersing the wafer into an oxidizing solution having a controlled concentration of impurity material therein to cause a new layer of impurity impregnated oxide to be grown over the preselected surface areas. The wafer may then be heated in a diffusion oven to cause the predeposited impurities to be driven from the oxide into the surface of the wafer.

3,607,470

THIXOTROPIC GELLED LIQUID ROCKET FUEL CONTAINING HYDRAZINE AND ALUMINUM HYDRIDE COATED WITH A SEMICARBAZIDE COPOLYMER

James M. Lucas, El Dorado Hills, Calif., assignor to Aerojet-General Corporation, El Monte, Calif.

Filed Jan. 12, 1968, Ser. No. 698,660
Int. Cl. C06b 19/02
U.S. Cl. 149—6 6 Claims

This patent describes a thixotropic, storage and mechanically stable, gelled liquid rocket fuel comprising hydrazine fuel containing therein a suspension of a polysemicarbazide coated aluminum hydride, and the method for the preparation of the same.

3,607,471

SOLID COMPOSITE PROPELLANTS WITH SALTS OF FERROCENE MONOSULFONIC ACID AS BURNING RATE MODIFIERS

Stephen W. Osborn, Yardley, Pa., assignor to Thiokol Chemical Corporation, Bristol, Pa.

Filed Oct. 13, 1961, Ser. No. 145,538
Int. Cl. C06d 5/00; C10l 9/10
U.S. Cl. 149—19 22 Claims

1. A solid propellant composition based on a polymer selected from the group consisting of hydrocarbon, polysulfide and urethane polymers and comprising, as a burning rate modifier component thereof, approximately 1 to 3 percent by weight of said composition of at least one salt of ferrocene monosulfonic acid which is less volatile than ferrocene.

3,607,472

WHITE SMOKE COMPOSITION CONTAINING RED PHOSPHOROUS

Bernard E. Douda, Bloomfield, Ind., assignor to The United States of America as represented by the Secretary of the Navy

Filed Nov. 12, 1969, Ser. No. 876,118
Int. Cl. C06d 3/00
U.S. Cl. 149—19 5 Claims

A white smoke producing composition comprised of between 8 and 12 percent of magnesium, between 30 and 34 percent of magnesium dioxide, between 0 manganese 3 percent of zinc oxide, between 0 and 4 percent of lead dioxide, between 38 and 45 percent of red phosphorus and between 10 and 18 percent of a resinuous binder.

3,607,473

COMPOSITIONS FOR AND METHOD OF PRETREATING PLASTIC SURFACES TO IMPROVE ADHESION OF COATING MATERIALS

John J. Grunwald, New Haven; John P. Homrok, Terryville, and Ralph R. Wilkinson, Waterbury, all of Conn., assignors to MacDermid Incorporated, Waterbury, Conn.

Filed Mar. 4, 1968, Ser. No. 709,955
Int. Cl. B44c 1/22; C23b 3/00
U.S. Cl. 156—2 16 Claims

Bath compositions and processes are disclosed for use in pretreating the surface of various synthetic molded plastics to improve adhesion to the surface thereof of films of different coating materials, such as paint, ink and adhesives, for example. An aqueous emulsion of an organic surface activating agent, followed by a strong acid aqueous oxidizing solution, are employed in the treatment of the plastic surface to effect the desired surface modification.

3,607,474

METHOD OF MAKING AN OPTICAL MASK FOR REPRODUCING CIRCUIT BOARDS

Samuel H. Hensdale, Kernersville, N.C., assignor to The United States of America as represented by the Secretary of the Army

Filed Jan. 26, 1968, Ser. No. 700,696
Int. Cl. B32b 31/24; B44b 1/22
U.S. Cl. 156—3 2 Claims

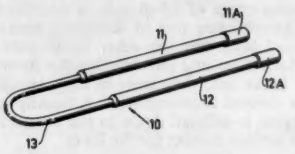
A method of making an etched stripline circuit board comprising a copper-clad substrate covered with an etch-resist Mylar tape. A precision coordinatograph is employed for cutting the circuit through the Mylar tape on a 1:1 scale; unneeded portions of the tape are stripped away, and the remaining portions of the tape are utilized as a resist during an etching process.

3,607,475

METHOD OF MANUFACTURING ELECTRICAL RESISTANCE ELEMENTS AND ELEMENTS MANUFACTURED BY THE METHOD

Nils Gustav Schrewelius, Hallstahammar, Sweden, assignor to Aktiebolaget Kanthal, Hallstahammar, Sweden

Filed Oct. 24, 1967, Ser. No. 677,569
Claims priority, application Sweden, Oct. 24, 1966, 14564-66
Int. Cl. C23f 17/00; H01j 1/02
U.S. Cl. 156—6 10 Claims



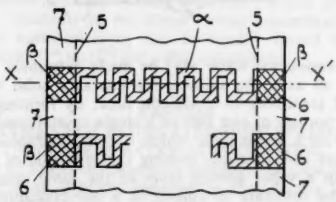
An electric resistance element of molybdenum disilicide has a thin incandescent zone whose dimensions are formed by chemical decomposition, dissolution or corrosion.

3,607,476

METHOD OF MANUFACTURING THIN FILM CIRCUITS

Rene Besamat, and Philippe Basseville, both of Montreuil-sous-Bois, France, assignors to L.C.C.-C.V.C.E.-Compagnie Europeenne de Composants Electriques

Filed July 9, 1968, Ser. No. 743,410
Claims priority, application France, July 19, 1967, 114759
Int. Cl. H05k 1/00, 3/06
U.S. Cl. 156—11 1 Claim



A method for depositing a tantalum resistor with gold terminals on a substrate, which consists in masking part of the substrate with copper, producing a tantalum coating on the substrate by cathode-sputtering, and exploiting the differences in porosity between the tantalum, directly in contact with the substrate, and that in contact therewith through the medium of copper for removing all the deposits except that corresponding to the desired pattern.

3,607,477

ETCHANTS, THE TREATMENT OF MONCRYSTALLINE SEMICONDUCTOR WAFERS THEREWITH AND SEMICONDUCTOR DEVICES INCORPORATING SUCH WAFERS

Ravi Rao, London, England, and Robert I. Bradshaw, Kampala, Uganda, East Africa, assignors to Westinghouse Brake English Electric Semiconductors, Limited, London, England

Filed Mar. 17, 1969, Ser. No. 807,959
Claims priority, application Great Britain, Mar. 21, 1968, 13,619/68
Int. Cl. H01l 7/50
U.S. Cl. 156—17 1 Claim

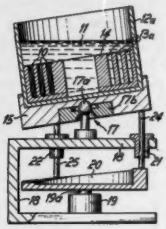
This method involves the use of a solution of gluconic acid and caustic alkali to remove contaminants from a silicon wafer mounted for processing on a header.

3,607,478

METHOD OF TREATING SEMICONDUCTOR ELEMENTS OF CIRCULAR OUTLINE

Karin Henninges, Stuttgart, and Bernd Schulze, Benningen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Dec. 5, 1968, Ser. No. 781,315
Claims priority, application Germany, Dec. 14, 1967, P 16 21 428.1
Int. Cl. H01l 7/00; B08b 3/10
U.S. Cl. 156—17 11 Claims



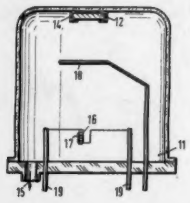
A method of and apparatus for treating elements of circular outline. A vessel is provided with guide grooves which are either straight and parallel to one another or are torus-shaped and concentric with one another. The vessel is mounted for tilting movement about a ball and socket joint and accommodates a bath of etching fluid. Disc-shaped elements to be treated are supported on edge in the respective guide grooves. A motor is mounted below the vessel and its output shaft drives a cam follower having at least one ascending and at least one descending surface portion, and in the case of straight parallel guide grooves two rod-shaped follower members are mounted for sliding movement in axial direction of the motor shaft with their ends resting on the cam disc surface and their upper ends engaging the bottom wall of the vessel so that, when they are shifted in axial direction of the motor output shaft, the vessel is tilted alternately to one side and the opposite side about the ball and socket joint. If the guide grooves are torus-shaped, then three such follower members are used which are circumferentially spaced about the axis at equiangular locations.

3,607,479

METHOD FOR PRODUCING METAL STRUCTURES UPON SEMICONDUCTOR SURFACES

Helmuth Murrmann, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Munich, Germany

Filed Sept. 11, 1967, Ser. No. 666,582
Claims priority, application Germany, Sept. 14, 1966, Sept. 14, 1966, S 105855;S 105859
Int. Cl. H01l 7/46; C23c 7/00
U.S. Cl. 156—17 8 Claims



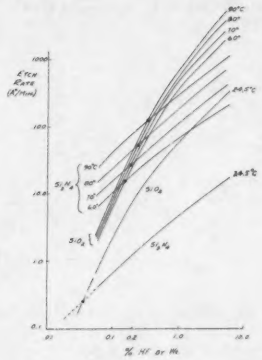
The invention describes a method of producing fine structures, preferably those consisting of a metal coating, upon semiconductor surfaces. More particularly, the invention relates to a method of producing metal layers upon semiconductor surfaces thus providing contact areas on semiconductor circuit components. The metal coating covers the entire area of the surface to be processed. According to conventional planar technique, the coated area is subsequently covered by a suitable photovarnish upon which the desired structure or configuration is impressed by photographic exposure and development of the photovarnish. The nonexposed areas of the metal coating are thereafter dissolved. According to the present invention, the metal deposition, initially covering the entire area of the surface to be processed, is given an addition of at least one metal which reduces the etching time required for subsequently eliminating the area portions not covered by the etching mask. This also stabilizes the semiconductor surface.

3,607,480

PROCESS FOR ETCHING COMPOSITE LAYERED STRUCTURES INCLUDING A LAYER OF FLUORIDE-ETCHABLE SILICON NITRIDE AND A LAYER OF SILICON DIOXIDE

Victor Harrap, Dallas, and Harold Gary Carlson, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1968, Ser. No. 787,738
Int. Cl. H01l 7/00
U.S. Cl. 156—17 17 Claims



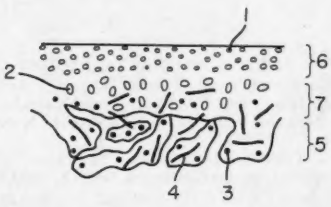
A single etchant process for etching a composite layered structure of silicon nitride and silicon dioxide. Hydrogen and fluoride ion-containing aqueous etching solutions, such as hydrofluoric acid having a concentration of less than approximately 2 percent by weight, and other equivalent solutions including ammonium fluoride and ammonium bifluoride solutions and fluosilicic acid, are applied to the structure while the temperature is maintained below the boiling point of these solutions, whereby the rate of etching of the silicon nitride is substantially equal to the rate of etching of the silicon dioxide.

3,607,481

PROCESS FOR PRODUCTION OF SYNTHETIC LEATHER

Toshikazu Shinohara; Hiroshi Hattori, and Konosuke Mitsukawa, all of Ohtsu-shi, Japan, assignors to Toyo Rayon Kabushiki Kaisha and Toray Industries, Inc., Tokoyo, Japan, part interest to each

Filed Sept. 15, 1967, Ser. No. 667,976
Claims priority, application Japan, Sept. 19, 1966, Mar. 4, 1967, 41/61482;42/13468
Int. Cl. B32b 23/02
U.S. Cl. 156—148 6 Claims



A synthetic leather is produced by impregnating a fiber web with a binder solution, coating one surface of the said

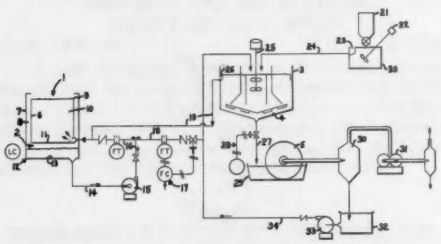
web with a solution of a synthetic resin having a viscosity higher than that of the said binder solution before the said binder is coagulated, and thereafter coagulating the said binder and the synthetic resin simultaneously. In another embodiment, it is produced by impregnating a fiber web with a binder solution, applying to one surface of the said web at least one kind of binder solution having a viscosity higher than that of the first-mentioned binder solution in the order of a lower viscosity before the already applied binders are coagulated, applying to the said surface a solution of a synthetic resin having a viscosity of 50–10,000 poises, and thereafter coagulating the said binders and the synthetic resin simultaneously.

3,607,482

PROCESS OF REGENERATION OF METAL TREATING SOLUTIONS

Robert P. Selm, Salina, Kans., assignor to Wilson & Company, Salina, Kans.

Filed Aug. 11, 1969, Ser. No. 849,052
Int. Cl. C23f 1/00; C23g 1/14
U.S. Cl. 156—19 **8 Claims**



A process for regeneration of spent and partially spent metal treating solutions, such as used for treating aluminum. The process includes collecting a portion of the metal-treating solution with the collected solution containing metal salts dissolved from the metal being treated in a treating space, recirculating a portion of the collected solution, and flowing the remainder into a clarifying stage where a precipitating agent is introduced and mixed therewith and solids formed at said stage settled out providing a clarified supernatant solution which is returned to the treating space. The metal salts removed are in the class of carbonates, sulfates, chromates and aluminates and the precipitating agent is an alkaline earth hydroxide, such as calcium hydroxide, barium hydroxide and strontium hydroxide.

3,607,483

METHOD OF CHEMICAL TREATMENT FOR ZINC OR ZINC-IRON ALLOY SURFACES

Nakaaki Oda, Takaoka-shi; Nagaharu Morioka, Takaoka-shi; Akira Yoshida, Tonami-shi, and Yoshio Makino, Takaoka-shi, all of Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan

Filed Oct. 8, 1969, Ser. No. 864,910
Int. Cl. C23g 1/02; C23f 3/00
U.S. Cl. 156—20 **8 Claims**

Zinc or zinc-iron alloy surfaces are treated with aqueous solution containing bichromate ($Cr_2O_7^{1}$) ions, nitrate (NO_3^{1}) ions, tripolyphosphate ($P_3O_{10}^{1111}$) ions, organic acid ions and surface active agent at pH 0.3–1.5 and in the treatment the surfaces are polished and have corrosion resistance.

3,607,484

ETCHING OF ALUMINUM

Gohein Marukawa, Tokyo; Takashi Oikawa, Tokyo; Ryotatsu Otsuka, Tokyo, and Naomi Kagaya, Kawasaki-shi, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 13, 1968, Ser. No. 783,717
Claims priority, application Japan, Dec. 13, 1967, 43/79542
Int. Cl. C23f 1/00; B44c 1/22; C23g 1/22
U.S. Cl. 156—22 **8 Claims**

An etchant liquid for metals (which consist mainly of aluminum) comprising an aqueous sulfuric acid solution containing halogen ions and the ions of a metal having an ionization tendency less than that of aluminum.

An etching bath containing the above liquid also comprising a water-immiscible organic liquid, and a surface active agent prepared by the phosphoric esterification of a polyalkylene glycol having alkylene oxide linked with the hydrocarbon residual group thereof.

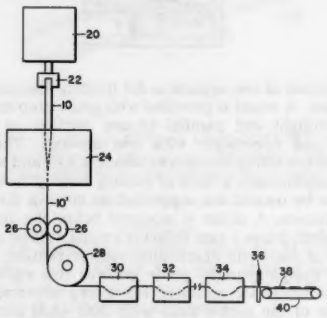
A process for forming a photographic image of an acid-resistant coating applied to the surface of a metallic plate (which consists mainly of aluminum) which comprises etching the plate using the described etchant liquid or etching bath.

3,607,485

METHOD OF MAKING GLASS RAZOR BLADES

Alan C. Bailey, Big Flats, and Harold E. Camp, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 23, 1967, Ser. No. 677,205
Int. Cl. C03b 37/02; C03c 15/02
U.S. Cl. 156—24 **4 Claims**



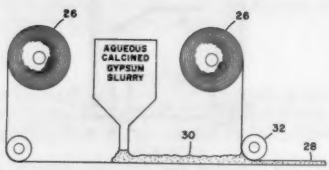
A blank of vitreous material is accurately ground to a desired razor blade configuration with specific dimensions, which are a multiple of the dimensions of the end product as represented by a predetermined attenuation ratio, and the blank is heated to about its softening point and drawn down with a desired attenuation to produce a continuous razor blade ribbon of uniform predetermined cross-sectional dimensions. The ribbon is then polished in an acid bath, provided with a lubricating coating, and cut into desired lengths for packaging.

3,607,486

PROCESS FOR MAKING WATER REPELLENT PAPER AND GYPSUM SHEATHING BOARD AND A COATING COMPOSITION USEFUL THEREIN

Norbie C. Jacks, and Jerry C. Sparks, both of Oxford, Ala., assignors to National Gypsum Company, Buffalo, N.Y.

Filed May 1, 1969, Ser. No. 820,961
Int. Cl. B32b 3/22; D21h 5/00; C08h 13/00
U.S. Cl. 156—41 **16 Claims**



A method for making vapor permeable, water repellent paper having one surface treated with water repellent bituminous material and an opposite surface substantially free of water repellent material using a coating composition comprising an aqueous asphalt emulsion and an organic solvent with substantially all of said organic solvent being dispersed in the water phase of said emulsion.

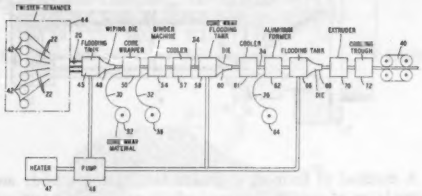
The process of making water repellent gypsum sheathing board using sheets of cover paper as described above.

3,607,487

WATERPROOF ELECTRICAL CABLE

Merle C. Biskeborn, Chatham; Joseph P. McCann, Colonia, and Raffaele A. Sabia, Lincroft, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 2, 1968, Ser. No. 780,314
Int. Cl. H01b *13/06, 13/22*
U.S. Cl. 156—47 8 Claims



An electrical communications cable having a plurality of insulated conductors is made waterproof by filling the interstitial spaces with a heated mixture of 85 percent petroleum jelly and 15 percent low-density polyethylene and cooling the mixture.

3,607,488

ORNAMENTAL PRODUCTS MADE FROM PLANT MATERIAL

Ernesto J. Colon Yordan, Box 2049, Ponce, P.R.

Filed July 9, 1968, Ser. No. 743,282
Int. Cl. A01n *3/00*
U.S. Cl. 156—57 9 Claims

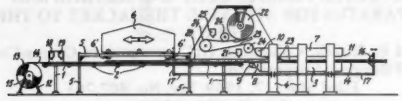
There is provided an ornamental object and a process for producing the same. Naturally occurring plant material is comminuted to a desired size and shape, e.g., one-sixteenth to 1 inch, treated with a preservative, e.g. formaldehyde, dyed, dried and coated with a waterproof resinous sealer.

3,607,489

METHOD FOR MANUFACTURE OF COATED BOARDS MADE OF WOOD SHAVINGS, FIBERS AND SIMILAR MATERIALS

Jonas Anders Gote Helgesson, Vallentuma, Sweden, assignor to Ingenjorsfirman B-Projekt Aktiebolag, Stockholmsvagen, Enebyberg, Sweden

Filed June 6, 1968, Ser. No. 734,946
Claims priority, application Sweden, Dec. 18, 1967, 17344/1967
Int. Cl. B29j *5/06, 5/08*
U.S. Cl. 156—62.2 13 Claims



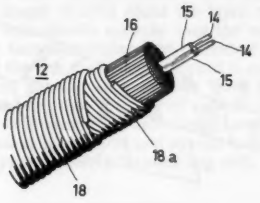
The invention provides method and apparatus for the manufacture of pressed synthetic fiberboard. A continuous web containing a layer of particulate material is drawn to a hot press having a stationary lower plate, pressed to form the fiberboard, and withdrawn from the press. The said web and consequent pressed fiberboard are moved to and through the press under traction provided by a traction means pulling the pressed fiberboard from the press cooperating with a braking means acting on the web at a position before said web is charged with the layer of particulate material.

3,607,490

METHOD OF MAKING A FLEXIBLE SIGNAL TRANSMISSION CABLE FOR AN AERODYNAMIC BODY

Werner Heinzmann, Ottobrunn, and Siegfried Pfahl, Hagen/Holthausen, both of Germany, assignors to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Germany

Division of Ser. No. 812,277, Apr. 1, 1969, Pat. No. 3,533,349.
Filed Mar. 19, 1970, Ser. No. 22,286. Claims priority, application Germany, Apr. 6, 1968, P 17 65 133.1
Int. Cl. H01b *13/12, 13.26*
U.S. Cl. 156—56 6 Claims



A flexible electrical cable for transmitting control signals between a control station and a rapidly moving aerodynamic body includes at least two parallel enamel-insulated conductor wires cemented together in parallel relation and extending centrally through a tension member formed by a large number of thin individual filaments, and further includes a covering closely embracing the wires and the tension member and comprising superposed layers wound around the tension member in opposite respective angular directions. The conductor wires are high purity electrolytic copper having an elongation equal to or greater than 24 percent and, in the bare condition, a diameter of 0.07 mm. The tension member comprises a plurality of parallel filament strands, of 14μ diameter, or a polyester fiber having an elongation of substantially 7 percent to 8 percent. The covering layers comprise natural silk having a composition of 4×13/15 den. In producing the cable, the conductor wires, which are separately insulated in an enameling operation, are cemented together in parallel relation. The tension member filament strands are presorted and fed to a spinning device along with the parallel conductor wires. The tension member is covered, in two successive spinning operations, having the same spinning angle but different directions of rotation. The conductor wires are fed to the spinning device under a braking force of 40 g. The apparatus includes two serially arranged wire spinning devices, the first of which has a fixed spindle provided with an axially bore therethrough and a guide plate arranged close to the spinning head. The guide plate has a central opening for the conductor wires and plural openings for the tension member filament strands, these openings being arranged in a circle concentric with the central opening and at angular interval of 120°.

3,607,491

FLEXIBLE POROMERIC SHEET MATERIAL WITH A SUEDE FINISH

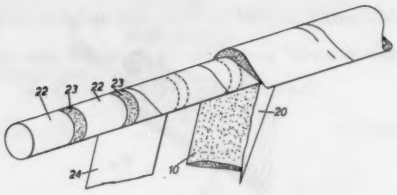
Ed Caldwell Brown, Hartville, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Nov. 14, 1969, Ser. No. 877,037
Int. Cl. B32b *5/18*
U.S. Cl. 156—77 15 Claims

This invention is a process of making a flexible poromeric sheet material with a suede finish and the product produced by this process. A phase-invertible polymer solution, comprising an extended urethane polymer, a polyvinyl chloride resin, and a water-miscible solvent, is cast in a film onto a solid surface and phase-inverted in a water bath, containing a surface-active agent, to form a three-layered material comprising a skin layer adjacent the solid surface, a poromeric suede layer loosely bound to the skin layer, and a substantially smooth poromeric anchoring layer atop and integral with the suede layer. The product is removed from the sur-

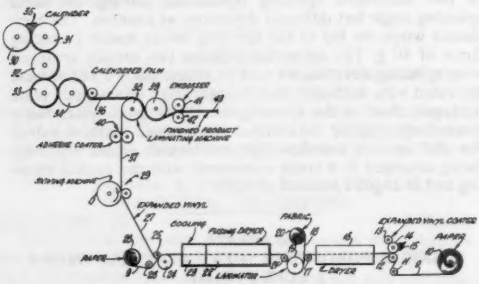
face and the skin layer removed from the suede layer to reveal a flexible poromeric sheet material with a suede finish.

3,607,492
PROCESS FOR PREPARING COMPOSITE TUBE
Donald George Keith, Mount Eliza, and Donald Robert Burch, Forest Hill, both of Australia, assignors to Imperial Chemical Industries of Australia and New Zealand Limited, Melbourne, Victoria, Australia
Filed Nov. 18, 1968, Ser. No. 776,731
Int. Cl. B32b *31/00*
U.S. Cl. 156—79 **20 Claims**



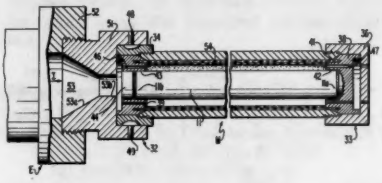
A process for the manufacture of composite tubes which may be multiwalled which comprises the steps of (a) rotating a tube having a wall thickness small in relation to its overall diameter around its longitudinal axis, (b) moving a ribbon of flexible material past foam-dispensing means and depositing a layer of nascent foam upon one face of the said ribbon, (c) feeding the said coated ribbon tangentially onto the rotating tube at an angle to the longitudinal axis of the tube such that the said coated ribbon forms a spirally wound envelope around the tube and (d) causing or allowing the foam to expand and cure.

3,607,493
METHOD OF MAKING A PLASTIC-COATED FABRIC
Albert E. Anderson, Norwich, Conn., assignor to Pervel Industries, Inc., Plainfield, Conn.
Filed Apr. 12, 1968, Ser. No. 721,002
Int. Cl. B32b *31/12*
U.S. Cl. 156—83 **12 Claims**



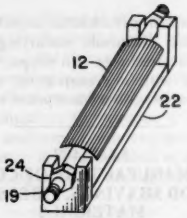
The invention contemplates plastic-coated fabrics wherein the exposed surface is a special skin over a layer of expanded plastic, thus imparting richness to the "feel" of the product. In making this product, the customary release sheet is first removed, and then a layer of plastic skin is stripped from the expanded-plastic layer, so as to expose the character of the expanded plastic; the voids and interstices of this packed surface are utilized for strikingly effective bonding of a separate skin layer, which may be a calendered film. As a final step in the bonding of skin to the expanded plastic, selected embossing rolls not only compress the laminations for enhanced adhesion but also impart surface contours for desired textural effects.

3,607,494
METHOD OF FORMING A COATED ROLL
Leroy J. Rowland, Charleston, S.C., assignor to Rowland Enterprises, Inc., Charleston, S.C.
Filed June 13, 1969, Ser. No. 832,973
Int. Cl. B32b *31/30, 31/12*
U.S. Cl. 156—86 **5 Claims**



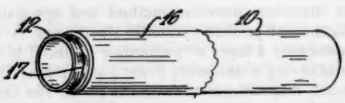
A method of forming a coated roll having a body and an outer layer of coating material which comprises positioning a tubular sleeve of release material, having on its inner surface a layer of coating material, in surrounding relationship with the body, compressing the layer of coating material to bond the layer to the outer surface of the body and subsequently removing the tubular sleeve.

3,607,495
TUBE-FABRICATING PROCESS
John G. Davis, Jr., Newport News, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration
Filed Oct. 22, 1968, Ser. No. 769,592
Int. Cl. B29c *27/00*
U.S. Cl. 156—86 **8 Claims**



A method of fabricating uniaxial filament reinforced plastic tubes is disclosed wherein plies of uncured epoxy resin preimpregnated filament sheets are wrapped around a mandrel and a heat-shrinkable sleeve is used to apply pressure against the plies while the epoxy resin is being cured.

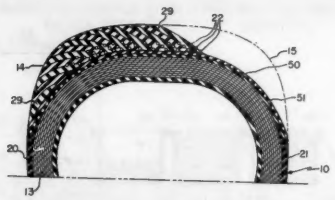
3,607,496
JACKETED FIBROUS DUCT AND METHOD AND APPARATUS FOR APPLYING THE JACKET TO THE DUCT
Ronald E. Kissell, Columbus, Ohio, assignor to Owens-Corning Fiberglass Corporation
Filed Mar. 17, 1969, Ser. No. 807,761
Int. Cl. B29c *27/20*
U.S. Cl. 156—86 **8 Claims**



The disclosure embraces a rigid duct of bonded fibers sheathed or encased in a heat-shrunk jacket and involves a

method of and apparatus for applying a tubular jacket of a suitable heathshrinkable organic film onto the fibrous duct and applying heat to the end regions of the jacket and throughout the length of the jacket whereby the same is heat-shrunk or contracted to snugly engage and enclose the exterior surfaces of the fibrous duct.

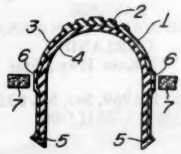
3,607,497
TIRE-TREADING METHOD
Dennis S. Chrobak, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed June 30, 1969, Ser. No. 837,795
Int. Cl. B29h *17/37*
U.S. Cl. 156—95 **9 Claims**



A method of applying a cord-reinforced tread to a tire carcass in which; a ribbon of uncured rubber stock is formed, cord reinforcing is applied longitudinally to the ribbon, and the ribbon and cord are wound about the circumference of the tire in a plurality of turns to form the tread.

The foregoing abstract is not to be taken as limiting the invention of this application, and in order to understand the full nature and extent of the technical disclosure of this application, reference must be made to the accompanying drawings and the following detailed description.

3,607,498
METHOD OF PRODUCING TIRES HAVING DECORATIVE SIDEWALLS
Hirokazu Kubota, Kobe, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Dec. 12, 1967, Ser. No. 689,903
Claims priority, application Japan, May 17, 1967, May 17, 1967, May 30, 1967, May 30, 1967, 42/3181;42/31812;42/35048/35049
Int. Cl. B29h *17/04, 21/02*
U.S. Cl. 156—116 **2 Claims**



A method of producing a tire having on each sidewall thereof a band or bands of fluorescent colors which will not be detached from the tire body and remain fresh over a prolonged period of time and which are effective in decorating the tire particularly in the nighttime, said method comprising constructing the tire body with an outer rubber layer and an inner rubber layer having a color-developing effect and bonded integrally to said outer rubber layer, grinding each sidewall of the tire body by a grinder to form therein an annular groove or grooves and forming in said annular groove or grooves a laminate of an elastic undercoating layer of transparent anchoring agent and a fluorescent layer containing an ultraviolet ray-absorbing compound or a laminate of said undercoating layer, a fluorescent layer and a transparent top-coating layer containing the ultraviolet ray-absorbing compound.

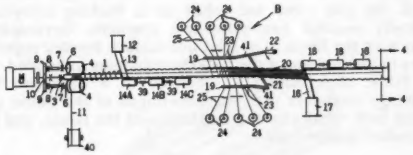
3,607,499
METHOD OF MAKING POWER TRANSMISSION BELTS
Albert J. Garbin, Cumberland, R.I., assignor to Owens-Corning Fiberglas Corporation
Division of Ser. No. 641,222, May 25, 1967, Pat. No. 3,496,783. Filed Feb. 24, 1969, Ser. No. 831,796
Int. Cl. B29d *29/00*
U.S. Cl. 156—137 **8 Claims**

A method of forming an annular rubber V-belt comprising the wrapping of a layer of vulcanizable rubber about a mandrel, winding a length of cord about the layer, wrapping a second layer of vulcanizable material over the wound cord, cutting the thus formed member into individual belt members, and curing the belt members. The cord is composed of a twisted together plurality of yarns; the yarns being composed of a twisted together plurality of strands; the strands being composed of a plurality of individual filaments of glass and the twist present in the yarns and strands being opposite. Preferably, the yarn assembly features one-half, 2½ or 3½ twists per inch.

3,607,500
A MOLDING FIBROUS WEBS
Nathan D. Field, Allentown, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed June 4, 1969, Ser. No. 830,533
Int. Cl. D04h *1/60*
U.S. Cl. 264—119 **11 Claims**

Expanded, nonwoven fibrous articles are formed by heating in a shaped mold compressed fibrous webs impregnated with a thermoplastic resin binder. The compressed webs may be economically shipped and the shaped articles generated at the point of destination.

3,607,501
METHOD FOR MANUFACTURING HOSE
Akira Okumura, 7-2 Sawaragi-Cho, Takatsuki, Osaka, Japan
Filed Oct. 30, 1968, Ser. No. 771,928
Int. Cl. B31c *13/00*
U.S. Cl. 156—143 **1 Claim**

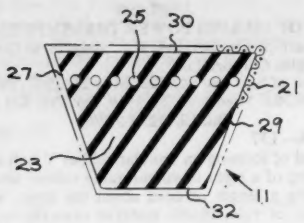


A method and apparatus for manufacturing a hose free of internal stress but having high flexibility by continuously winding a synthetic resin strip extruded from an extruder in half-molten state around a spiral member on a rotary shaft which has fully been restored by the resiliency of its own to the natural condition after having been spirally wound on the shaft.

3,607,502
INDUSTRIAL BELT CONSTRUCTION AND METHOD OF MANUFACTURING SAME
Alfred Marzocchi, and Albert J. Garbin, both of Cumberland, R.I., assignors to Owens-Corning Fiberglas Corporation
Division of Ser. No. 649,165, June 27, 1967, Pat. No. 3,473,400. Filed Feb. 27, 1969, Ser. No. 828,033
1969, Ser. No. 828,033
Int. Cl. B29h *7/22*
U.S. Cl. 156—142 **6 Claims**

A method of industrial belt manufacture comprising the steps of wrapping a first layer of rubber about a core, wind-

ing a continuous length of reinforcement material about the layer, the length of reinforcement material bearing a coating which, on exposure to heat, expands to a cushionable sheath,

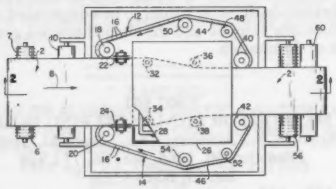


wrapping another layer of rubberlike material about the assembly, dividing the assembly into a plurality of rings and heat curing the rings whereby the cushionable sheath is formed.

3,607,503
METHOD OF MANUFACTURING A NEEDLED HEAT-SHRINKABLE TUFTED PILE FABRIC

David B. Parlin, Thompsonville, Conn., and Ronald V. Canova, East Longmeadow, Mass., assignors to Bigelow-Sanford Inc., Thompsonville, Conn.

Filed Aug. 14, 1969, Ser. No. 850,153
Int. Cl. D04h *11/08*
U.S. Cl. 156—148 **16 Claims**



A process for the manufacture of tufted pile fabric in which the pile yarns are tufted on a backing comprising primarily needled heat-shrinkable synthetic thermoplastic fibers with the fibers of at least one surface bonded together, fibers in the interior of the backing remaining unbonded, and the fabric after tufting is subjected to a widthwise heat shrinkage treatment with the dimensions of the fabric controlled both widthwise and lengthwise of the fabric, and at a controlled temperature.

3,607,504
METHOD OF FABRICATING A BOX BEAM

James S. Howard, Riverside, Calif., assignor to Rohr Corporation, Chula Vista, Calif.

Filed Jan. 30, 1969, Ser. No. 795,232
Int. Cl. B32b *31/00*
U.S. Cl. 156—155 **6 Claims**

Method of forming a lightweight compartmented box beam of resin-impregnated fiberglass tape and honeycomb core material, employing a segmented soluble mandrel about which said tape is wrapped.

3,607,505
METHOD OF PRODUCING A LAMINATED TUBULAR ARTICLE

Henry G. Schirmer, Spartanburg, S.C., assignor to W.R. Grace & Co., Duncan, S.C.

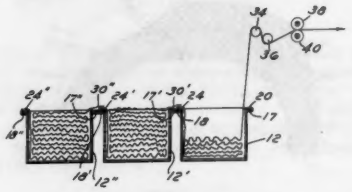
Filed Aug. 11, 1967, Ser. No. 659,940
Int. Cl. B29c *17/00*
U.S. Cl. 156—156 **9 Claims**

A laminated, tubular, thermoplastic film having high tensile strength, shrink energy, and tear resistance is produced by continuously extruding a layer of a first thermoplastic material onto a tubular substrate of a second thermoplastic material and then cooling, heating, and stretch-orienting the resulting laminate. By repeating the process, multiplelayer laminates may be produced.

3,607,506
PROCESS FOR CONTINUOUSLY FEEDING SEPARATE LENGTHS OF SHEET MATERIALS

Harold C. Gerwin, Fraser, and Angelo V. Pugliese, Jr., Mount Clemens, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 28, 1968, Ser. No. 755,846
Int. Cl. B65h *75/02*
U.S. Cl. 156—157 **4 Claims**



Sheets of polyvinyl chloride about 5 inches wide and 7,500 feet long are folded into individual containers by a set of feed rolls reciprocating back and forth across the container opening. Each sheet is placed in its container so pulling on one end will draw the sheet linearly therefrom and the other end extends a short distance outside of the container opening. At least two containers are placed adjacent each other and the ends of the sheets are heat fused together so processing equipment begins drawing the sheet from the second container after emptying the first container.

3,607,507
NOVEL SPLICING METHOD

Raymond J. Enos, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

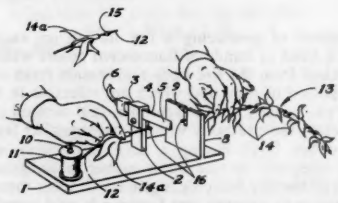
Filed Jan. 2, 1968, Ser. No. 694,791
Int. Cl. B65h *69/02*
U.S. Cl. 156—158 **8 Claims**

Disclosed herein is a method for splicing the ends of thermally stable fibers, filaments, strands, wires, etc., which comprises applying a thermally stable imide-forming polymer to the ends to be spliced and then converting the imide-forming polymer to a polyimide.

3,607,508
METHOD OF PRODUCING AN ORNAMENTAL GARLAND

Edward Ha, Jr., 49-721 Kam Hwy., Star Route Box 470, Kaaawa, Hawaii

Filed June 11, 1969, Ser. No. 832,331
Int. Cl. B31f *5/00*
U.S. Cl. 156—159 **10 Claims**



A method of producing an ornamental garland comprised of a row of tubular-necked flowers strung on a length of fila-

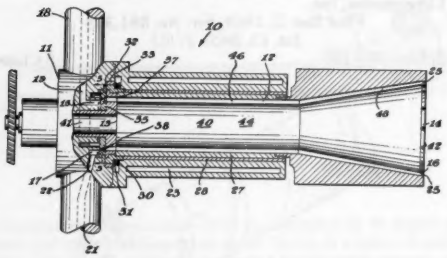
ment as, for example, in the manufacture of a lei; the method including the steps—repetitive in progression along the filament—of severing the filament at a point adjacent one flower previously strung thereon, the severed filament then providing one portion with said one flower thereon and a separate portion, stringing another flower on said separate portion of the filament, and then connecting said portions of the filament at their severed ends and in a fashion to produce an enlargement which—as a stop—limits movement of such other flower toward said one flower.

3,607,509

PRODUCTION OF NETLIKE STRUCTURES

Walter J. Schrenk, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 505,674, Oct. 29, 1965, Pat. No. 3,498,873. Filed July 16, 1969, Ser. No. 856,513
Int. Cl. D04h *3/07, 3/16;* B29f *3/12*
U.S. Cl. 156—167 7 Claims



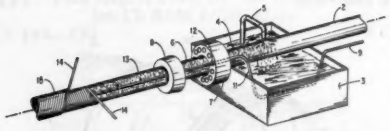
Thermoplastic net comprising bonded filaments which have at least two different thermoplastic components disposed in generally spirally arranged alternating layers wherein the material of one of the layers is monodirectionally oriented and the remaining material is generally unoriented is disclosed.

3,607,510

PLASTIC PIPE MANUFACTURE

Pietro L. Serafino, and Pietro L. Culla, both of Torin, Italy, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Aug. 18, 1969, Ser. No. 850,971
Claims priority, application Italy, Oct. 14, 1968, 40450-A/68
Int. Cl. B65h *81/03*
U.S. Cl. 156—172 5 Claims



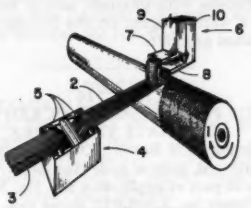
Lightweight pipe having a plastic core and a fibrous wrapping is obtained by first coating the core with a composition containing a polymerizable liquid resin, typically a polyester resin, and an accelerator therefor. Thereafter fibrous material in bundles, impregnated with a substance such as the liquid resin composition, is applied to the resin-bearing core, along the axis of the core, with adjacent bundles being spaced apart. Catalyst-impregnated additional fibrous material is then wound about the intermediate fiber-and-resin-bearing article. This wound article is next wrapped with fibrous mats impregnated with the liquid resin composition or the like and is subsequently wrapped with plastic film. The resulting article has enhanced burst strength and is particularly useful in irrigation.

3,607,511

COMPOSITE REINFORCED PLASTIC PIPE

James L. Grosh, Los Altos, Calif., assignor to United Aircraft Corporation, East Hartford, Conn.

Division of Ser. No. 641,962, May 29, 1967, Pat. No. 3,470,917, Continuation-in-part of application Ser. No. 546,676, May 2, 1966, now Patent No. 3,483,896. Filed June 25, 1969, Ser. No. 842,075
Int. Cl. B65h *54/00*
U.S. Cl. 156—173 4 Claims



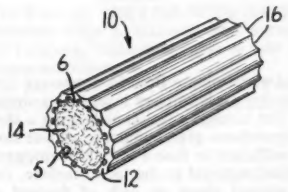
A process for providing reinforced plastic pipe wherein particulate material is incorporated in the resin matrix between the layers of continuous filaments. The particulate material is applied in a bimodal manner with coarse particles being applied first and fine particles applied over the coarse particles to fill the spaces therebetween.

3,607,512

EXTRUDING TOW FILLED MOUTHPIECE ROD HAVING SERRATED INNER SURFACES CLENCHING THE TOW

George L. Mathe, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Jan. 3, 1969, Ser. No. 788,903
Int. Cl. B32b *5/00*
U.S. Cl. 156—178 2 Claims

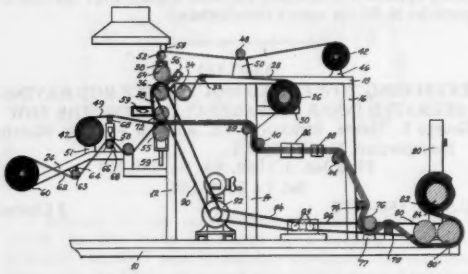


A method with which a continuous length, tubular article filled with a tow of a fibrous material and having serrated or grooved inner surfaces clenching the tow is disclosed. The article is formed by extruding thermoplastic material as a tubular sheath having a smooth inner surface at extrusion around an advancing tow of fibers, the serrations or grooves being formed by spraying a cooling fluid against the inner wall surface of the plastic sheath at circularly spaced locations therein as it leaves the extrusion aperture. The cooling fluid functions to chill and set the inner wall surface sufficiently so that when the tubular sheath is thereafter pulled down from an initial to a final size, the sheath will pull down to a lesser extent at said spaced locations than at the still more plastic surfaces intervening said spaced locations thereby forming longitudinal grooves in the sheath inner wall surface.

3,607,513
MANUFACTURE OF FIBER-REINFORCED, BITUMEN-CONTAINING PRODUCTS
Sigbert Samson, Rozendaal, Gilderland, Netherlands, assignor to American Enka Corporation, Enka, N.C.
Filed June 21, 1968, Ser. No. 738,815
Claims priority, application Netherlands, June 29, 1967, 67-09049
Int. Cl. B29h *9/04*
U.S. Cl. 156—181 **8 Claims**

A process for producing fiber-reinforced, bitumen-containing products which comprises reinforcing a bitumen-containing material with a fibrous material comprised of synthetic linear polycondensation products and substantially enhancing the adhesion between the fibrous material and the bitumen with the presence of an auxiliary substance comprising a resinous material that has a softening point between 50° and 160° C., is miscible with bitumen, and in the molten condition, acts as a wetting agent on the fibrous material of the polycondensation products.

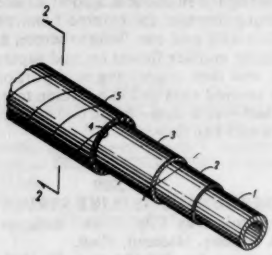
3,607,514
METHOD OF PRODUCING A FLOCKED NONWOVEN LAMINATE STRUCTURE
Milton K. Solomon, 198 Beach 133rd St., and Norman Weill, 132-17 Boulevard, both of Belle Harbor, N.Y.
Continuation-in-part of application Ser. No. 366,054, May 8, 1965, now Patent No. 3,368,932, dated Feb. 13, 1968. This application Nov. 6, 1967, Ser. No. 680,785
Int. Cl. B32b *31/00*
U.S. Cl. 156—182 **2 Claims**



A method of forming a flocked nonwoven fabric laminate structure having a plurality of layers by a single continuous operation. The method consists of heating a sheet or web of foamed polyurethane plastic material on one surface thereof, for a time sufficient to fuse a layer thereto, pressing a sheet of nylon tricot material to the tacky surface, simultaneously heating a second sheet or web of foamed polyurethane plastic material on one surface thereof for a time sufficient to fuse a layer thereto, pressing a second sheet of nylon net material to the tacky surface of the second sheet, then pressing the tacky nylon webs together to secure them together, and spraying the outer surface of one sheet of foamed polyurethane plastic material with flock substance.

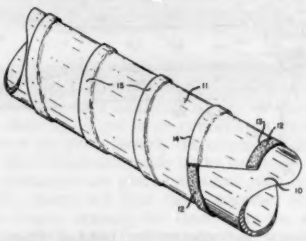
3,607,515
ASBESTOS PIPELINE FELT
Walter L. Pennie, Elmhurst, Ill., assignor to Allied Chemical Corporation, New York, N.Y.
Filed July 18, 1967, Ser. No. 654,139
Int. Cl. B65h *81/04*
U.S. Cl. 156—187 **6 Claims**

An improved corrosion and stress resistant coating-wrap system for pipelines is made by coating the contacting surface of asbestos felt with a thin coating layer of either coal tar compounds having softening points in the range of about 120° F.–250° F. or natural and synthetic rubber-based coating compounds. Subsequent application of this coated felt to



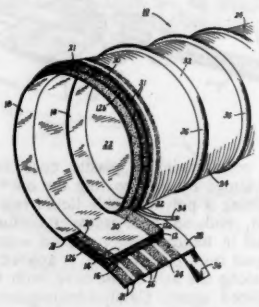
the hot enamel coating on a pipeline results in a void free felt-enamel interface.

3,607,516
METHODS OF COATING PIPE
John H. Royston, Pittsburgh, Pa., assignor to Royston Laboratories, Inc.
Filed Dec. 2, 1969, Ser. No. 881,365
Int. Cl. B65h *81/03*
U.S. Cl. 156—187 **5 Claims**



A method is provided for forming an electrically insulative pipe by the steps of assembling an elongated wrapper having an inner band of self-adhering adhesive and an outer band of a mechanically strong material and wrapping said wrapper about a pipe to be protected with one side edge being bent upon itself so as to form an exposed edge of adhesive engaging the adhesive on the opposite edges of the wrap whereby to form an adhesive-to-adhesive bond at the overlap.

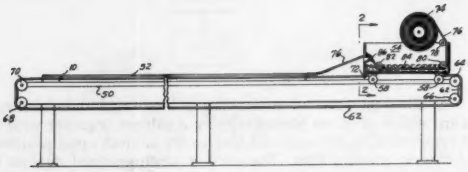
3,607,517
METHOD OF MAKING INSULATED WIRE-REINFORCED FLEXIBLE HOSE
Richard B. Pelley, East Kingston, N.H.; James R. Warner, Groveland, Mass., and George E. Herbert, Haverhill, Mass., assignors to Callahan Mining Corporation, New York, N.Y.
Division of Ser. No. 717,304, Mar. 24, 1968, Pat. No. 3,554,237. Filed Jan. 27, 1970, Ser. No. 10,104
Int. Cl. B65h *81/04*
U.S. Cl. 156—195 **7 Claims**



The disclosed hose comprises an inner strip of insulating material laminated with heat reflective sheeting and covered

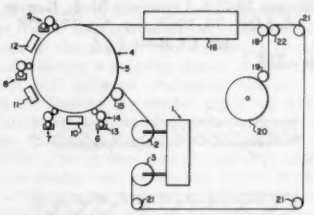
with a flexible tape. The composite is wound into a hose with the lateral edges of consecutive tape convolutions overlapped and adhered together to form a helical seam. A helically deformed reinforcing wire is lodged in the helical seam just prior to its formation and a wear strip may be adhered thereover for abrasion resistance. The inner seam of the hose is sealed by a band of heat-reflective material. The hose is manufactured by a continuous process in which the insulating strip, band, tape and wear strip are fed through a pressure guide which bonds them together, and the composite hose cover is then fed to hose forming apparatus.

3,607,518
METHOD OF PRODUCING EXPANDED DOUBLE-FACED HONEYCOMB PANELS
Daniel H. Ellinor, 11418 Denton Drive, Dallas, Tex.
Filed Dec. 12, 1969, Ser. No. 884,676
Int. Cl. B31d *3/02*
U.S. Cl. 156—197 **10 Claims**



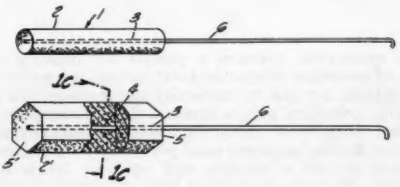
Compressed honeycomb stock is expanded to fit inside a frame and temporarily secured in the frame in expanded condition. The frame, with the expanded honeycomb therein, is then surfaced on both sides with layers of scrim or cheesecloth which have been saturated with a solution of thermoplastic or thermosetting material in a volatile solvent. The cheesecloth is firmly in contact with the frame and with the crests of the honeycomb structure and adheres thereto with the thermoplastic acting as an adhesive. The solvent is permitted to evaporate and the frame, with the cloth facings, is then faced on both sides with a layer of metallic foil, preferably aluminum. The composite structure is then placed in a heated press for a time and at a temperature and pressure sufficient to reactivate the thermoplastic residue in the cloth and bring about a firm bond between the frame, the honeycomb, the cloth and the aluminum foil whereby to produce a panel or sandwich of honeycomb stock surfaced on each side with metallic foil.

3,607,519
LAMINATION OF PLASTIC PACKAGING FILMS
Myron S. Beyer, Danville; Stanley Manne, Markham, and G. R. Ramagopal, Urbana, all of Ill., assignors to Tee-Pak, Inc., Chicago, Ill.
Filed Aug. 7, 1967, Ser. No. 658,764
Int. Cl. B32b *31/20, 31/12*
U.S. Cl. 156—192 **9 Claims**



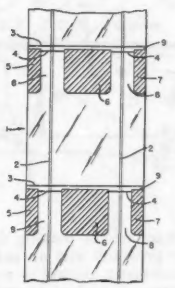
Plastic film laminates for use in the packaging of food products and other materials are formed by adhesive lamination of polyethylene films to films such as nylon, polyester, cellophane, polypropylene, polyethylene, polyvinyl chloride, etc., by adhesive lamination. The polyethylene portion of the laminate provides for heat sealability of the resulting film laminate. The nylon, polyester, cellophane, polypropylene, etc., film gives flex strength, abrasion resistance, gloss, vacuum formability, barrier properties, etc., to the wound laminate. These film laminates are particularly useful in vacuum-forming packing machines and for manufacturing plastic pouches. In the manufacture of the film laminate, a pressure-sensitive but curable adhesive is applied to one of the plies of the film laminate on an ordinary plastic-film-printing press and the two films combined and rolled up on a windup reel. The pressure applied to the film laminate in the windup reel is the only laminating force applied to the film and the film laminate is cured simply by being stored under pressure of being wound on the rolls. After curing of the adhesive, the plastic film plies cannot be separated without being torn. If desired, the film to which the adhesive is applied may also be printed prior to application of the adhesive so that the resulting film laminate is provided with a desired imprint positioned between the film plies.

3,607,520
TAMPON MANUFACTURE
John Leslie Jones, Pasadena, Calif., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Division of Ser. No. 619,509, Feb. 13, 1967, which is a continuation-in-part of Ser. No. 350,193, Mar. 9, 1964, Pat. No. 3,342,237.
Filed Nov. 26, 1969, Ser. No. 879,984
Int. Cl. B29c *17/00*
U.S. Cl. 156—198 **6 Claims**



A process and apparatus for simultaneously manufacturing a multiplicity of one-piece, regenerated cellulose sponge tampons, for permanently bonding a coaxially disposed withdrawal string within the interior of each of the tampon bodies, and for compressing the tampons into their final form.

3,607,521
PLASTIC BAG OR THE LIKE WITH HANDLE
Heikki S. Suominen; Viljo J. Makinen, and Aarno S. Lindstrom, all of Tampere, Finland, assignor to said Suominen, by said Makinen and Linstrom
Division of Ser. No. 699,988, Jan. 8, 1968, Pat. No. 3,482,761. Filed May 9, 1969, Ser. No. 823,322
1969, Ser. No. 823,322
Int. Cl. B31f *1/00*
U.S. Cl. 156—199 **1 Claim**



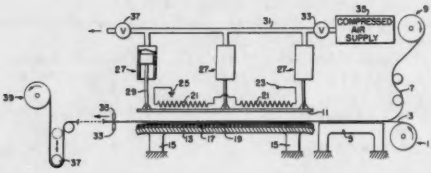
A method of manufacture of plastic bags with handles formed from a tube of thin film plastic material and with the

handles formed from the same material as the bag walls. Portions of the sidewalls of the tube of plastic material are cut away to form the handles, and in order to provide handles of sufficient strength to carry the load and to properly distribute the resulting stresses over the entire sidewalls of the bag, the tubular thin film of plastic is extruded so as to have portions thereof formed of a thicker material than the rest of the bag walls, and the handles are located so as to include portions of the thicker material.

3,607,522
PROCESS FOR FINISHING SUBSTITUTE LEATHER MATERIALS

Fred N. Phillips, Jr., Boston, and Donald Tobin, Needham, both of Mass., assignors to Allied Research and Development Co., Boston, Mass.

Filed Apr. 26, 1967, Ser. No. 633,942
Int. Cl. B32b *31/14*
U.S. Cl. 156—209 **8 Claims**

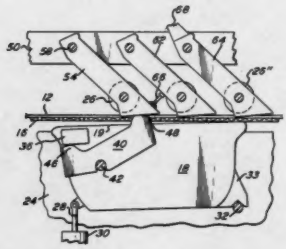


This application discloses a process for finishing long sheets of substitute leather material having one surface of thermoplastic material by contacting the thermoplastic surface with a similarly shaped textured sheet, heating the superposed sheets under pressure in a series of sequential steps in a press, feeding each untreated portion to the press as the preceding portion is finished, and removing the textured sheet only after tests on a sample show the desired finish has been produced; if not, the superposed sheets are reprocessed. The full specification should be consulted for an understanding of the invention.

3,607,523
DOUBLE FACER HEAT CONTROL METHOD AND APPARATUS

George W. McGirr, Delran, N.J., assignor to Harris-Intertype Corporation, Cleveland, Ohio

Filed July 28, 1969, Ser. No. 845,443
Int. Cl. B31f *1/20*
U.S. Cl. 156—210 **8 Claims**

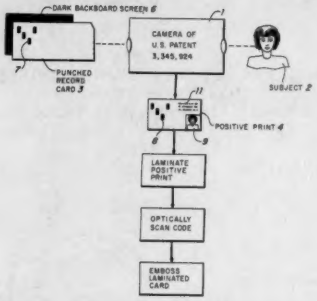


A double facer machine for making double-faced corrugated paperboard is provided with an automatic control for ballast rolls. The automatic control is responsive to movement of heated platens. As surface contact between the corrugated paperboard and the platens decreases due to movement of the platens away from the paperboard, ballast rolls are caused to move upwardly away from the paperboard.

3,607,524
METHOD OF PRODUCING A LAMINATED IMPRINTED DATA-BEARING CARD WHICH METHOD ELIMINATES COLLATION ERRORS

Roger J. Kuhns, Lincoln, Mass., assignor to Avant Incorporated, Lincoln, Mass.

Filed Jan. 13, 1970, Ser. No. 2,454
Int. Cl. B44b *5/00*
U.S. Cl. 156—220 **6 Claims**



A novel method of producing a laminated data-bearing card which involves photographing a subject together with a keypunched record card relating to the subject upon positive diffusion transfer film. The card is photographed against a dark background so that dark marks are recorded upon the positive print which marks correspond to the punched holes. The positive print is thereafter laminated to a protective cover sheet and is scanned by a code reader which in turn drives a printer which automatically embosses indicia such as a social security number corresponding to the code upon the card.

3,607,525
METHOD FOR TRANSFER OF A PICTURE FROM AN INITIAL SUPPORT TO A NEW SUPPORT

Oscar R. F. Strom, Nigerian Civil Aviation Training Centre, Zaria, Nigeria

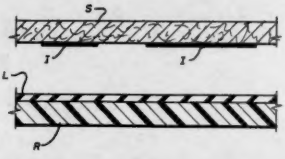
Filed July 17, 1968, Ser. No. 745,610
Int. Cl. B44c *1/16*
U.S. Cl. 156—235 **2 Claims**

In the transfer of a picture from an initial support to a new support, a method which comprises pressing a sheet covered with a glue means layer onto a printing dye layer contained on an original support, removing the sheet to leave the glue means layer on the printing dye layer, pressing into contact with the glue means layer an intermediate support comprising in layers above each other, a clear lacquer layer, an attachment means layer easily releasable from the lacquer layer and a base support layer, removing the original support, applying the intermediate support with said printing dye layer attached thereto onto a new support and removing the base support layer of the intermediate support.

3,607,526
TRANSFER PROCESS

Stanley R. Biegen, 2043 S. University Blvd., Denver, Colo.

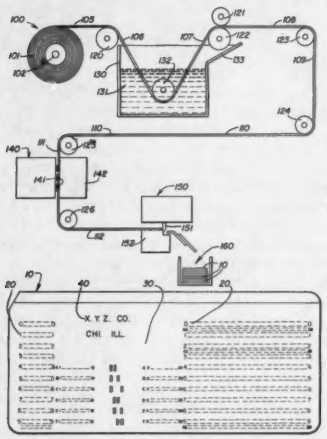
Filed Oct. 30, 1968, Ser. No. 771,775
Int. Cl. B44c *1/16*
U.S. Cl. 156—235 **16 Claims**



The disclosure concerns a method of transferring printed indicia from a paper sheet to a backing surface member by

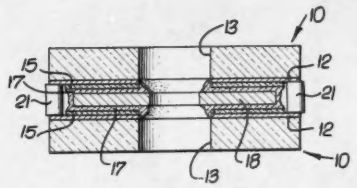
first pressing a film of tacky, contact adhesive, held on a release sheet, against the paper sheet. The sandwich consisting of the paper, the indicia, the adhesive and the release sheet is then soaked in water to remove the paper, leaving the indicia on the surface of the film, but eliminating to a substantial extent, the tacky character of the surface. Next, the backing surface is prepared to receive the indicia-carrying film, by either wetting the same with a solvent such as lacquer thinner which will render the adhesive film tacky or applying a layer of tacky, contact adhesive to this backing surface. It was determined that heat and pressure may also be operative to effect the transfer to the backing surface.

3,607,527
ADDRESSING METHODS
Ronald I. Morley, Minneapolis; Raymond W. Biernat, Minneapolis, and Arnold J. Smidt-Hayer, St. Paul, all of Minn., assignors to Dymo Industries, Inc., Berkeley, Calif.
Filed June 5, 1967, Ser. No. 643,718
Int. Cl. B41m *5/00, 7/00*
U.S. Cl. 156—238 **9 Claims**



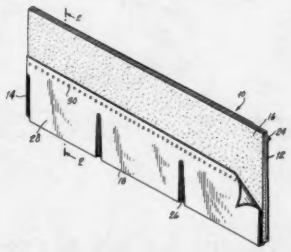
There is disclosed an addressing system including an addressing apparatus and addressing methods and materials used therein. A set of master cards is provided formed of porous tab card stock impregnated with a sensitizer vaporizable at 100° C. to 160° C. and having a selected area on one face thereof for the address in infrared absorbing ink; as disclosed, the master card is made by passing the porous tab card stock through a bath containing the sensitizer and a solvent therefor, after which the solvent is evaporated. The set of master cards is then employed to provide a master tape that is a strip of nonporous release material that is oleophobic and transparent to infrared radiation, and carrying thereon reverse reading copies of the addresses in the form of bodies of partially fused novel toner applied to one side of the master tape; the addresses are transferred from the master cards to the master tape utilizing a novel apparatus and method wherein a printing station is provided having a first source of infrared radiation thereat, first feed mechanism for feeding the master cards sequentially to the printing station and a second feed mechanism for feeding the master tape to the printing station to position a predetermined portion of the master tape immediately adjacent to the address on a master card positioned at the printing station, thereafter operating the first source of infrared radiation to vaporize from the master card sensitizer in areas corresponding to the address thereon onto the one surface of the master tape, applying a toner to the master tape to adhere toner to the sensitizer in areas corresponding to the address, and thereafter exposing the master tape carrying the powdered toner to a second source of infrared radiation for at least partially fusing the toner to provide a reverse reading copy of the address on the master tape. The novel toner comprises a vehicle body of wood rosin and polymerized resin, modifiers of polyamide resin and a hydrocarbon resin and pigment of carbon black. The master tape with the addresses thereon in partially fused toner is then fed to an addressing station where an envelope or other article to be addressed is placed with the surface thereof against the partially fused toner on a section of the master tape after which heat and pressure are applied thereto to transfer the bodies of toner to the envelope and fully to fuse the toner to provide on the envelope bodies of fully fused toner in areas corresponding to the address on a master card.

3,607,528
MAGNETIC MEMORY MEMBERS AND METHODS OF MAKING THE SAME
James S. Gassaway, 2356 Glendon Ave., Los Angeles, Calif. 90064
Filed Feb. 8, 1968, Ser. No. 704,031
Int. Cl. B44d *1/34, 1/40*
U.S. Cl. 156—230 **31 Claims**



A magnetic memory member produced by providing a master member of glass, or the like, having a predetermined finished surface to which a very thin silver or other parting agent may be applied, a magnetic coating of a desired thickness being applied to the parting agent, which coating may, for example, be magnetic particles in a binder or magnetic material plated directly on the parting agent, the magnetic coating assuming the same surface condition as the master member. A substrate is secured to the magnetic coating, the parting agent released from the master member and the parting agent removed from the coating. Where the magnetic coating includes a binder with magnetic particles therewithin, the magnetic memory member so produced has a dense film of magnetic particles concentrated at the outer surface of the coating for subsequent coaction with a recording or reproducing head.

3,607,529
METHOD FOR FORMING TAPERED COMPOSITE METAL-CLAD SHINGLES
Alexander A. Chalmers, Chagrin Falls, Ohio, and S. Ted Giunta, Caldwell, N.J., assignors to Alcan Aluminum Corporation, Cleveland, Ohio
Filed Mar. 6, 1969, Ser. No. 804,822
Int. Cl. E04d *15/07*
U.S. Cl. 156—238 **6 Claims**



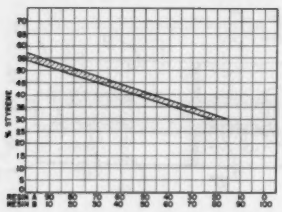
A method for continuously manufacturing metal-clad shingles which have a taper from their forward edge to their rear

edge, which comprises the steps of depositing a plasticized asphaltic composition upon a continuously moving backing web, shaping the composition to form a tapered shingle body having at its rear edge a composition thickness not substantially greater than the backing web and a greater thickness at the forward body edge. A metal foil is adhesively applied to the rear face of the continuously moving backing web, and a metallic sheathing is continuously preformed and applied to a portion of the face of the asphaltic material on the backing web as the backing web continues its forward movement.

3,607,530
PREPARATION OF GLASS-REINFORCED POLYESTER SHEETS

Robert E. Carpenter, Minnetonka, Minn., assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Dec. 13, 1967, Ser. No. 690,143
Int. Cl. B29c *19/00*
U.S. Cl. 156—245 **2 Claims**

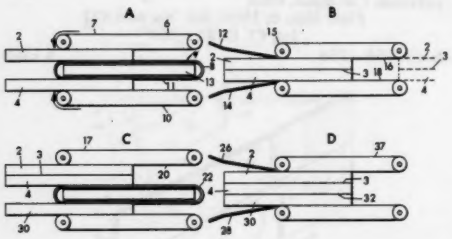


A method for the preparation of clear or transparent glass-reinforced plastic sheets or panels using a mixture of two different resins in controlled proportions. Rigid fiberglass-reinforced polyester panels (e.g., corrugated or decorative), having a negligible glass pattern when observed with the unaided eye, can be prepared in this manner. Such glass panels have a uniform appearance and can be made substantially clear or transparent.

3,607,531
CRYOGENIC INSULATION SYSTEM

Augustus B. Small, Brussels, Belgium; Paul T. Gorman, Arenzano, Italy, and Frederick J. McGarry, Weston, Mass., assignors to Esso Research and Engineering Company

Filed July 12, 1967, Ser. No. 652,748
Int. Cl. B32b *31/18*
U.S. Cl. 156—251 **6 Claims**

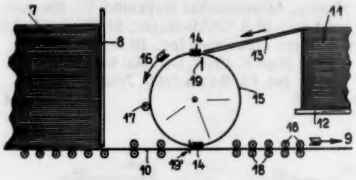


According to the teachings of the instant invention, a high-strength cellular plastic insulation system comprised of alternating layers of cellular plastic and thin columns of solid plastic is formed by heat sealing blocks of the cellular plastic together. The resulting product, while retaining its high insulation efficiency, has greatly improved compressive strength and increased fatigue resistance.

3,607,532
METHOD AND APPARATUS FOR THE REFERENCED LABELING OF SHEET MATERIAL

Henri Bobst, Lausanne, Switzerland, assignor to J. Bobst Et Fils S. A., Lausanne, Switzerland

Filed May 12, 1967, Ser. No. 638,144
Claims priority, application Switzerland, May 20, 1966, 7425/66
Int. Cl. B65c *1/02*
U.S. Cl. 156—252 **10 Claims**

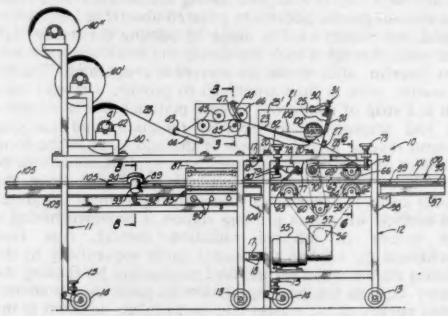


Accurate and consistent application of a label or the like to a sheet of cardboard or the like in fixed relation to a reference point on the cardboard is effected by an apparatus comprising a sheet material feeding means, a label feeding means, a label transport means synchronized with each of said sheet and label feeding means, a referencing means on said transport means in fixed relation to said label being carried thereby to cut and index said sheet material and thereby provide a uniform reference for application of said label and for further processing of said labeled sheet material. The label may be glued and as the glued label is brought into contact with the cardboard the cutting tool is operated to simultaneously notch the cardboard and/or the paper in the vicinity of the cardboard edge so that the composite cardboard-labeled sheet will be in exact relation to the print regardless of any irregularities which the edge of the cardboard might possess.

3,607,533
PORTABLE LAMINATING MACHINE AND METHOD

Alfred A. Moore, San Gabriel, Calif., assignor to Paste-Well Corporation, El Monte, Calif.

Filed Aug. 19, 1969, Ser. No. 851,236
Int. Cl. B32b *31/10;* **B05c** *3/18*
U.S. Cl. 156—259 **38 Claims**



A compact, portable machine and method for laminating sheet stock to substrate and equally suitable for onsite or central plant lamination of a decorative cover sheet to wallboard and the like building components with minimum handling and labor. The adhesive applicator has no moving parts and applies uniform coating to the web as the web is ad-

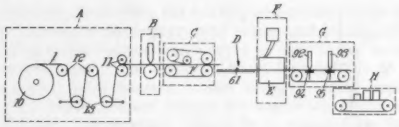
vanced beneath a supply of adhesive thereby applying a drag on the supply to create a roll of adhesive rolling counter to the direction of the web travel thereby applying the outermost layer of adhesive to the web. A single pair of laminating rollers press the laminae together while advancing the same. Rotating brushes depress the marginal edges of the web about the edges of the substrate without need for adjustment to compensate for tolerance variations in substrate width or synchronizing the brush speed with that of the laminate.

3,607,534

BAGMAKING APPARATUSES

Isaj Gutman, Harrow, England, assignor to Flexigrip, Inc., Orangeburg, N.Y.

Filed May 8, 1969, Ser. No. 823,012
Claims priority, application Great Britain, May 9, 1968, 22,073/68
Int. Cl. B32b *7/06*
U.S. Cl. 156—269 **12 Claims**



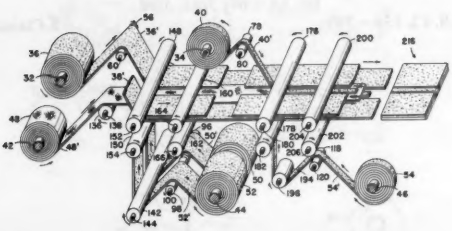
The bagmaking apparatus comprises a supply supplying intermittently a flattened tube of synthetic material having a lateral fastener; a transverse cutting and welding device; a device for placing a slider on the fastener of each tube element delimited by the cuts and welds; and a welding device for welding the cut portions of the tube elements.

3,607,535

APPARATUS AND METHOD FOR MAKING AND COATING BOOK COVER BOARD STRUCTURES

Edward K. Mullen, Westfield, and Leewood C. Carter, Warren Township, both of N.J., assignors to Book Covers, Incorporated, Newark, N.J.

Division of Ser. No. 446,820, Apr. 9, 1965, Pat. No. 3,476,406.
Filed Nov. 29, 1968, Ser. No. 805,057
Int. Cl. B32b *31/18, 31/20*
U.S. Cl. 156—269 **16 Claims**



A book cover board construction is provided wherein a multilayer spine board and a pair of multilayer leaf boards are hinged together by a strip of material between the respective panels and the entire structure encapsulated by an adherent coating material. The coating material is applied in fluid form so as to cover the panels in a thin coating. The coating can be applied by curtain coating or by spraying.

3,607,536

TREATMENT OF RESIN SURFACES TO IMPROVE ADHESIVE BONDING, ADHESIVE BONDING PROCESS AND RESIN BODIES WITH TREATED SURFACES

Robert Anthony Bragole, West Peabody, Mass., assignor to USM Corporation, Flemington, N.J.

Filed Nov. 7, 1968, Ser. No. 774,204
Int. Cl. B44d *1/50;* **C08f** *27/10*
U.S. Cl. 156—272 **20 Claims**

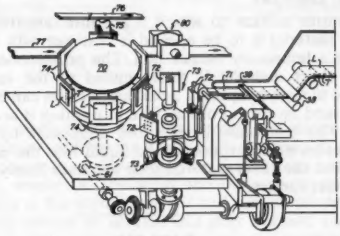
Surfaces of difficultly bondable resinous substrates, e.g. polyethylene, are treated to provide an organic isocyanate and a photosensitizer at the surface and thereafter subjected to ultraviolet radiation. The radiation causes an interaction between the isocyanate and the surface of the substrate to create a surface stratum for strong adhesive bonding.

3,607,537

SYSTEM OF LABEL VERIFICATION CONTROL AND PRODUCT ACCOUNTABILITY

George W. Von Hofe, Millington, and Edwin K. Wolff, Stockholm, both of N.J., assignors to New Jersey Machine Corporation, Hoboken, N.J.

Filed Feb. 12, 1968, Ser. No. 704,916
Int. Cl. B65c *9/46, 3/14*
U.S. Cl. 156—277 **6 Claims**



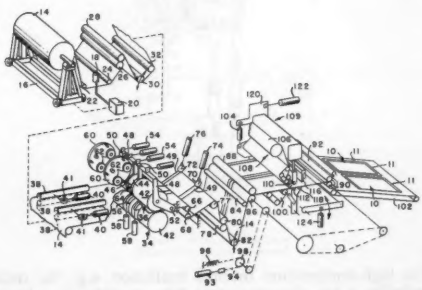
A system for preparing a continuous web with a longitudinally extending series of labels, a longitudinally extending series of slit tags which are removed by the manufacture for his records, and a longitudinally extending series of tabs which are removed by the distributor on delivery of a labeled package to a consumer. Control information is simultaneously applied to the associated labels, tabs and slit tags when the labels are printed on the web and in the labeling machine to effect verification of the labels and the accountability of the products labeled thereby.

3,607,538

SEALED EDGE PROCESS

Oscar M. Fuller, Gaffney, and Norman E. Klein, Inman, both of S.C., assignors to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed June 20, 1969, Ser. No. 834,943
Int. Cl. B32b *31/20, 31/08*
U.S. Cl. 156—271 **2 Claims**



Edge-sealing process to produce a textile product which is automatically sealed on at least three edges with a plastic film material to eliminate the sewing of a hem.

3,607,539

METHODS OF MANUFACTURING FACING PANELS

Romil Tonisberg, Bromolla, Sweden, assignor to Aktiebalaget Ifoverken, Bromolla, Sweden

Filed Dec. 23, 1969, Ser. No. 887,788
Claims priority, application Sweden, Jan. 3, 1969, 43/69
Int. Cl. B32b *31/06*
U.S. Cl. 156—276 3 Claims

A novel method of manufacturing decorative facing panels comprises continuously applying the materials of the panels to a continuously moving supporting foil. To begin with, a layer of reinforcing material is applied to the supporting foil and impregnated with resin, and on top of this layer there is placed a sand layer, whereupon another layer of reinforcing material is applied and impregnated with resin. Finally, the decorative layer is placed in the uppermost layer of reinforcing material.

3,607,540

METHOD OF APPLYING PRESSURE-SENSITIVE SHEETING

Leon E. Hoogstoel, Schenectady, N.Y., assignor to Norton Company, Troy, N.Y.

Filed June 11, 1968, Ser. No. 736,170
Int. Cl. B32b *31/12*
U.S. Cl. 156—289 9 Claims

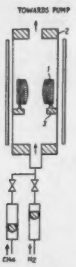
A porous surface to which a pressure-sensitive adhesive coated material is to be applied is first wet with a liquid to provide a temporary barrier film. The pressure-sensitive adhesive sheet material is then applied to the surface and because of such temporary liquid barrier film can be slid over and around on the porous surface to position it accurately in place. The temporary barrier film disappears by means of evaporation or absorption of the liquid into the porous substrate and the sheet material then becomes firmly affixed to the porous surface.

3,607,541

PROCESS FOR PRODUCING PYROLYTIC CARBON IMPREGNATED THERMAL INSULATING CARBONIZED FELT

Francis Tombrel, Saint-Gratien, France, assignor to Societe Le Carbone Lorraine, Paris, France

Filed June 30, 1967, Ser. No. 650,366
Claims priority, application France, Feb. 27, 1967, 96228
Int. Cl. C09j *5/00*; C10b *49/00*; F16l *59/00*
U.S. Cl. 156—280 6 Claims



For high-temperature thermal insulation, e.g., for rockets or missiles, a low density carbon felt assembly of carbonized viscose rayon felt is appropriately shaped and subjected to pyrolysis with a gas-containing chemically combined carbon, e.g., methane, at a reduced pressure and at low or high temperatures, e.g., 1,800° C.

3,607,542

UNDERWATER ADHESIVE PROCESS

Fred Leonard, 7713 Beech Tree Road, Bethesda, Md., and George Brandes, 8750 Georgia Ave., Silver Spring, Md.

Continuation-in-part of application Ser. No. 699,062, Jan. 19, 1968, Continuation-in-part of application Ser. No. 586,316, Oct. 10, 1966, now abandoned. This application Sept. 12, 1969, Ser. No. 857,538
Int. Cl. C09j *5/04*
U.S. Cl. 156—285 1 Claim

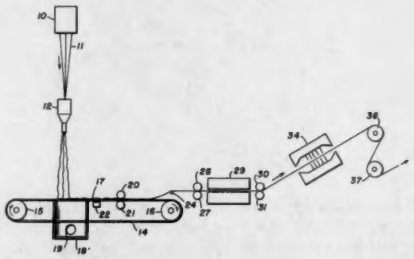
Pastes of α-cyanoacrylic acid esters and insoluble fillers can be applied to surfaces submerged in water for securing thereto, in situ, a wide variety of metallic and nonmetallic substances.

3,607,543

PROCESS FOR FORMING LIGHTWEIGHT NYLON NONWOVEN WEB

Philip J. Stevenson, 2624 McDowell Road, and Robert P. Teulings, Hudson Road, both of Durham, N.C.

Filed Mar. 21, 1969, Ser. No. 809,319
Int. Cl. C09j *7/00*
U.S. Cl. 156—306 9 Claims



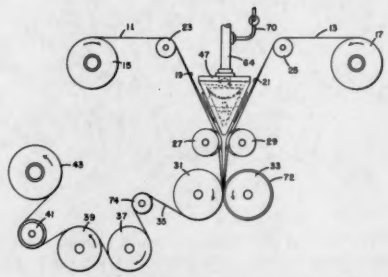
A method of forming a lightweight nonwoven bonded web of nylon comprises collecting nylon filaments on a moving foraminous belt at a rate to form a web which weighs less than 1 oz/yd², providing a vacuum beneath the belt, contacting the web while on the belt with an activating gas to lightly bond the filaments together at filament crossover points, and removing the web from the belt prior to the belt's entering an arc around a belt-supporting roller.

3,607,544

MIXTURE OF STEAM, ALCOHOL AND POLYALKYLENEIMINE AS ADHESION PROMOTER FOR LAMINATES

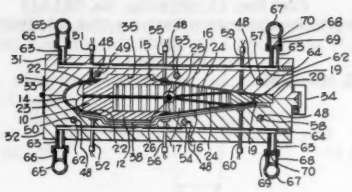
Richard J. Earner, Claymont, Del., and Raymond A. Thomas, Jr., Elkins Park, Pa., assignors to FMC Corp., Philadelphia, Pa.

Filed Apr. 30, 1969, Ser. No. 820,382
Int. Cl. C09j *5/02*, *5/06*
U.S. Cl. 156—307 5 Claims



A mixture of steam and a volatile alcohol incorporating an additive proportion of a polyalkyleneimine, a method of laminating using this mixture and a laminate prepared therewith, are disclosed herein.

3,607,545
METHOD FOR ADHESIVELY BONDING HELICOPTER ROTOR BLADE ASSEMBLIES
John T. Parsons, and Jack L. Ritchey, both of Traverse City, Mich., assignors to Hitco, Gardena, Calif.
Filed Aug. 8, 1968, Ser. No. 751,297
Int. Cl. C09j *5/00*
U.S. Cl. 156—311 3 Claims

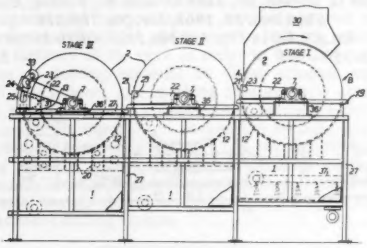


Method for controlling the heating and cooling steps in adhesive bonding of helicopter rotor blades and similar articles containing metal masses which serve as heat sinks. To bring the temperature at the adhesive bond line equally to flow temperature, local heaters, which roughly define separate zones of a metal pressure fixture, are separately energized to raise the zone temperatures unequally, to compensate for the local drain of heat into the heat sink. For cooling, liquid is pumped through passages while the local heaters cycle on as required to equalize the rate of cooling.

ERRATUM

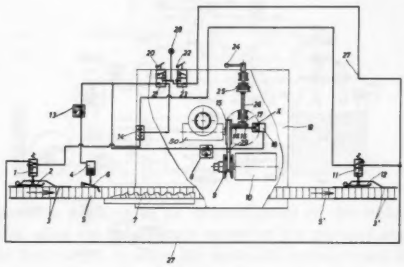
For Class 156—329 see:
Patent No. 3,606,922

3,607,546
APPARATUS FOR ACID POLISHING OR LIKE TREATMENT OF GLASS ARTICLES
Michael Grealey, Brierley Hill, England, assignor to Stevens and Williams Limited, Brierley Hill, Staffordshire, England
Filed Nov. 25, 1968, Ser. No. 778,581
Claims priority, application Great Britain, Dec. 15, 1967, 57,230/67
Int. Cl. C03c *15/00*
U.S. Cl. 156—345 12 Claims



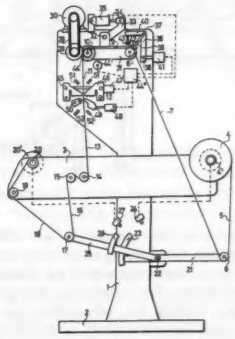
Apparatus for acid-polishing glassware by loading the articles into a revolving cage or cages having a movement in a vertical plane. Each cage is divided into peripherally spaced pockets or compartments to receive glasses, the pockets facing in opposite directions so that articles are placed in position as the pocket is moving in a downward path, discharge which takes place on the upward path, being semiautomatic utilizing gravity. The machine is emptied by a simple semiautomatic transfer system where the glasses are automatically transferred into a duplicate apparatus for swilling (second stage) final demineralized swilling (third stage) and hot air drying (fourth stage), producing the finished article with a minimum of labor and effort and to a high standard of quality.

3,607,547
LABELING MACHINE
Hermann Kronseder, Berliner Str. 10, 8402 Neutraubling, Germany
Filed July 30, 1969, Ser. No. 846,077
Claims, priority, application Germany, Oct. 16, 1968, P 18 034 332.4
Int. Cl. B32b *35/00*
U.S. Cl. 156—351 5 Claims



A labeling machine for handling upright containers, such as bottles or cans, and having a bottle input conveyor, a bottle output conveyor, a label-applying mechanism, variable speed drive, sensors at the input and output conveyors, a container stop at the input conveyor and control mechanism subject to the sensors to actuate said stop and said variable speed drive to stop containers coming into the machine and reduce machine speed when the sensors respectively sense a deficiency of containers at the machine input and/or an accumulation of containers at the machine output.

3,607,548
WELDING MACHINE FOR PLASTIC FOIL WEB
Viggo Rasmus Hansen, Naestved, and Per Juel Hagemeister, Glostrup, both of Denmark, assignors to C. A. Harnden Limited, Hyde, Cheshire, England
Filed Oct. 4, 1968, Ser. No. 765,183
Claims priority, application Denmark, Oct. 10, 1967, 5039
Int. Cl. G05g *23/02*
U.S. Cl. 156—358 7 Claims



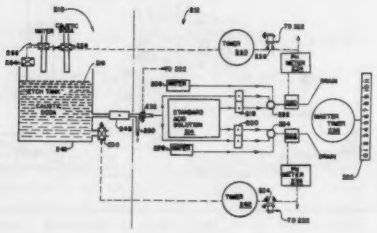
A machine for carrying out transverse weldings and perforations in a web of plastic foil, in which the foil web is advanced in stages, having supplying means for the web and means for welding and perforating. The advancing means is

positioned between the supplying means and the treatment means. A mechanism is provided for keeping the section of the web between the advancing means and the treatment means slackened during the welding operation, the perforating means forming part of this mechanism.

3,607,549
AUTOMATIC CHEMICAL ANALYZER AND CONTROLLER

Ewald J. Bielefeld, Jr., Benbrook, and Maurice J. Puma, Fort Worth, both of Tex., assignors to General Dynamics Corporation

Filed Oct. 9, 1968, Ser. No. 766,161
Int. Cl. G01n *31/16;* **C23f** *1/08;* **G05d** *11/08*
U.S. Cl. 156—345 **2 Claims**

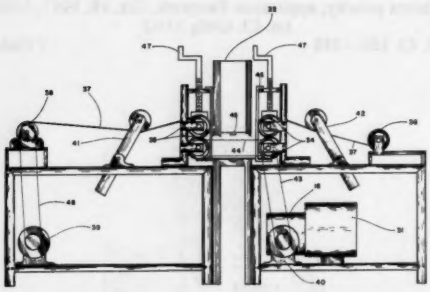


A method and apparatus for the automatic monitoring, analyzing and controlling of the etch rate and chemical concentration of a chemical-milling solution responsive to pH values at first and second equivalence points for both caustic soda and inhibitor.

3,607,550
APPARATUS FOR MAKING PLASTIC BAGS

Thomas Cass Ballanger, Hickory; Jake Schoonderwoerd, Hickory, and John H. Oldham, Charlotte, all of N.C., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del.

Filed Nov. 22, 1968, Ser. No. 778,217
Int. Cl. B32b *31/04*
U.S. Cl. 156—358 **8 Claims**



Disclosed herein is an apparatus for effecting longitudinally spaced apart transverse seals with a high degree of linear accuracy in a continuous web of plastic material having a plurality of layers. The apparatus comprises two sets of dual sealer drive rollers for advancing the web past the sealer, and a means for accurately controlling the operation of the sealer and drive rolls. This control means comprises a digital converter operatively in contact with the drive rollers, adapted to convert the angle through which the roller has rotated into a train of electrical pulses. A counter is operatively connected to the converter and is responsive to the train of pulses so that when a predetermined number of these pulses are recorded, an electrical signal is emitted that activates a brake to stop the drive rolls and concomitantly activates a sealer.

3,607,551
ROTARY PRESS WASTE REMOVAL AND FOLDING APPARATUS

Karl A. Klingler, Frankenthal/Pfalz, Germany, assignor to Schnellpressenfabrik Frankenthal, Albert & Cie Aktiengesellschaft, Frankenthal/Pfalz, Germany

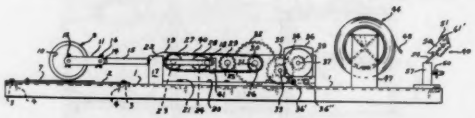
Filed Dec. 13, 1968, Ser. No. 783,629
Claims priority, application Germany, Dec. 18, 1967, P 16 11 301.2
Int. Cl. B32b *31/14*
U.S. Cl. 156—361 **2 Claims**

An apparatus for the removal of waste printed material used in conjunction with a folding device on a rotary printing press. The apparatus includes a conveyor system having a pivotable cantilevered conveyor and a fixed conveyor. Both conveyors have conveyor belts which are capable of running independently of each other. The cantilevered conveyor with its independent delivery belt can be pivoted by a suitable adjusting device that is actuated by a timer. The timer also activates a reversible motor, connected to the cantilevered conveyor so that as this conveyor is rotated downwardly, the motor reverses its direction and speeds up its conveyor belt, thus depositing wasted printed material in a remote location for subsequent removal.

3,607,552
APPARATUS FOR MAKING STANDARDIZED TAPE SPECIMENS

Sylvester G. Domen, Sr., 3165 Orleans St., Mobile, Ala.

Filed Dec. 31, 1968, Ser. No. 789,056
Int. Cl. G01n *19/04;* **B30n** *3/02;* **G01b** *19/08*
U.S. Cl. 156—378 **5 Claims**



The apparatus employs a polished steel substrate on which a test tape with its adhesive side down is pressed by a rubber coated roller. The latter is moved over the tape in one direction and then in the reverse direction. The roller is connnected through a swinging yoke and a swivel joint to one end of a horizontally positioned actuator rod. The other end of the rod is provided with a slot which receives one end of a short rod which is adapted to rotate within the slot. The last mentioned rod, at its opposite end is fixedly secured to a small metal plate which is secured to an outer link of a chain passing over a number of aligned sprocket wheels. One of the

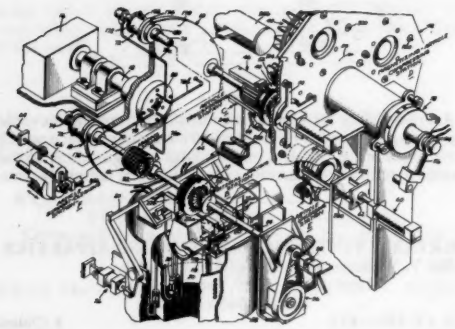
wheels is driven by a gear to which power is transmitted through a gear train by a synchronous motor. The small plate, in following the moving chain link, causes the actuator rod to travel back and forth in strict alignment with its axis and at the same instantaneous speed. Thus, the roller is given a strictly uniform speed over the tape. The tape is dispensed from a large roll and cut to proper width by a pair of trapezoidal-shaped cutters, spaced 1 inch apart over which the tape is pulled from the roll.

3,607,553

APPARATUS FOR PRODUCING A PROTECTIVE COATING ON THE SURFACE OF A MANUFACTURED ARTICLE

Harold L. Fritzsche, Fort Wayne, Ind., assignor to General Electric Company

Filed Feb. 27, 1969, Ser. No. 803,036
Int. Cl. B29c *25/00;* **B44d** *1/094;* **C23c** *3/04*
U.S. Cl. 156—380 **15 Claims**



Apparatus for forming a protective coating on an article of manufacture, such as a core formed from a stack of magnetic laminations. The material from which the protective coating is formed contains magnetic particles. Each core is carried by a different one of a plurality of article support and masking assemblies mounted on a first conveyor; e.g., a first rotary indexing assembly which rotates each of the support and masking assemblies sequentially through an Article-Loading Station, Material-Applying Station, Article-Transferring Station, and an Article Support-Cleaning Station. At the Article-Transferring Station, the core is transferred to a Magnetizing-Article Compressing Station, which transports the coated core to an Article-Unloading Station on a second conveyor. At the Magnetizing and Compressing Station, a magnetic field magnetically compresses the laminations and concurrently magnetically draws the protective coating material to selected surfaces of the core in order to form an increased thickness of coating material on those selected surfaces. Each of the support and masking assemblies is connected through a rotary valve to a fluid pressure source which feeds fluid through the assembly to accomplish masking and cooling of selected regions of the core. At the Article Support-Cleaning Station each support and masking assembly is mechanically cleaned to remove any residual protective coating material therefrom before the assembly is again indexed to the Article-Loading Station.

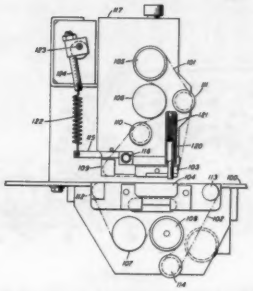
3,607,554

APPARATUS FOR JOINING SHEET MATERIAL ALONG A TWO-DIMENSIONAL CONTOUR

William R. Heffernan, Westfield, N.J., assignor to Bondit Corp., Newark, N.J.

Filed Mar. 12, 1969, Ser. No. 806,489
Int. Cl. B29c *24/00, 27/04;* **B32b** *31/04*
U.S. Cl. 156—380 **7 Claims**

Apparatus for joining layers of sheet material along a two-dimensional contour by means of dry thermally active adhesive therebetween comprises belt means for moving the materials lengthwise in a predetermined first direction, radiofrequency means for heating the adhesive to cause it to liquefy or plasticize, first means for applying a releasable compressive pressure to the materials and the adhesive in the area to be joined, and pivot pin means for applying constant



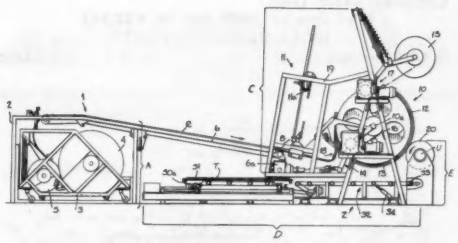
compressive pressure to an isolated point of the materials, thereby, upon the momentary release of the pressure applied by the first means, to allow the materials to be pivoted about the isolated point and to be joined along the contour.

3,607,555

MULTIPLE WORK STATION TIRE BUILDING MACHINE

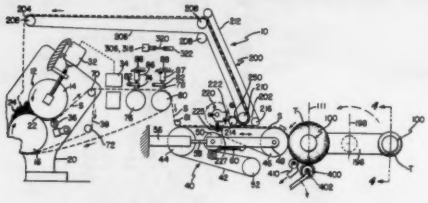
Jean Leblond, and Jean Biet, both of Compiegne, Oise, France, assignors to Uniroyal Englebert France S.A., Paris, France

Filed Sept. 10, 1968, Ser. No. 758,788
Claims priority, application France, Sept. 17, 1967, 121393
Int. Cl. B29h *17/20, 17/26*
U.S. Cl. 156—396 **11 Claims**



A tire-building machine, having a feed mechanism for supplying a continuous strip of breaker material, a severing device which severs the strip into strip portions, a transfer mechanism for transporting the severed strip portions to a given location at which there is positioned a breaker building drum and including an arrangement for applying to the building drum at said location the severed strip portions in alternatingly opposed orientation, a tire carcass support and shaping member spaced from the building drum, a transport mechanism for transporting tire tread material toward the breaker building drum positioned at said given location and for there applying the tread material to an annular breaker built up thereon, and a transfer ring for transferring a completed breaker-tread assembly from the building drum onto a carcass supported on the shaping member.

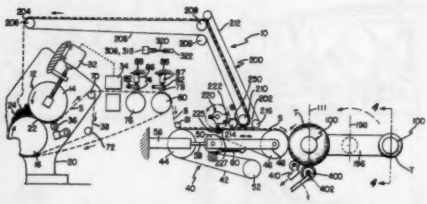
3,607,556
TIRE BUILDING MACHINE INCLUDING AN ELASTOMER CONVEYOR
Paul E. Appleby, Cuyahoga Falls, and Christopher E. Christie, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed June 11, 1969, Ser. No. 832,163
Int. Cl. B29h *17/10*
U.S. Cl. 156—405 4 Claims



A mill for forming a thin sheet of a curable elastomer and a tire carcass-receiving drum are combined in apparatus including a conveyor spaced from the mill and engageable with a tire carcass on the drum so as to rotate the drum and wind thereon a continuous plurality of convolutions of the sheet. Slitters located in a space traversed by the sheet between the mill and the conveyor and controlled by a profiling device to be movable in timed relation to the rotation of the carcass vary the width or widths of the sheet portion applied while a second conveyor diverts remaining portions of the sheet from the first conveyor for return to the mill.

The foregoing abstract is not to be taken as limiting the invention of this application, and in order to understand the full nature and extent of the technical disclosure of this application, reference must be made to the accompanying drawings and the following detailed description.

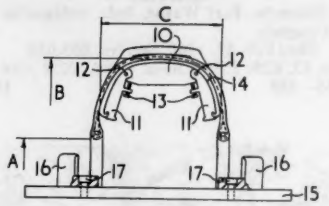
3,607,557
MACHINE FOR FORMING AND WINDING TREAD MATERIAL ON A TIRE
William R. Casey, and Christopher E. Christie, both of Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed June 11, 1969, Ser. No. 832,362
Int. Cl. B29h *17/10, 17/37*
U.S. Cl. 156—405 3 Claims



A mill for forming a thin sheet of a curable elastomer and a tire carcass-receiving drum are combined in apparatus including a conveyor spaced from the mill and engageable with a tire carcass on the drum so as to rotate the drum and wind thereon a continuous plurality of convolutions of the sheet. Slitters located in a space traversed by the sheet between the mill and the conveyor and controlled by a profiling device to be movable in timed relation to the rotation of the carcass vary the width or widths of the sheet portion applied while a second conveyor diverts remaining portions of the sheet from the first conveyor for return to the mill.

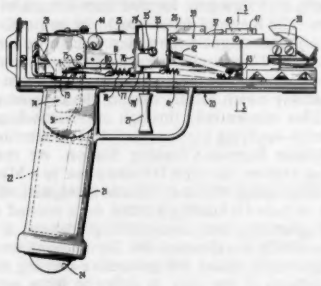
The foregoing abstract is not to be taken as limiting the invention of this application, and in order to understand the full nature and extent of the technical disclosure of this application, reference must be made to the accompanying drawings and the following detailed description.

3,607,558
TIRE BUILDING FORMER HAVING CYLINDRICAL AND TOROIDAL CONFIGURATIONS
Noel Nebout, Montlucon Allier, France, assignor to The Dunlop Company Limited, London, England
Filed Mar. 9, 1967, Ser. No. 621,855
Claims priority, application France, Mar. 11, 1966, 53,139
Int. Cl. B29h *17/06, 17/16, 17/26*
U.S. Cl. 156—415 16 Claims



A tire-building former having radially and axially movable supporting elements to provide a tire-building surface which is rigid in both cylindrical and toroidal configurations of the former specifically to facilitate the building of radial-ply tires.

3,607,559
PORTABLE SYNTHETIC YARN-SPLICING APPARATUS
Willie V. Williams, P. O. Box 687, Dalton, Ga.
Filed Jan. 9, 1969, Ser. No. 790,077
Int. Cl. B65h *21/00*
U.S. Cl. 156—433 2 Claims

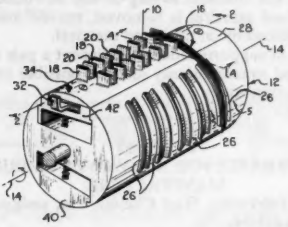


A lightweight pistol-type synthetic yarn slicer employing radiant heat to fuse the synthetic yarn without direct contact between the yarn and heating element. The apparatus contains a first retarder for the trigger stroke causing the yarn ends to traverse the heating zone in a controlled manner and a second retarder unit causes delayed activation of an indicator which, in effect, times the exposure of the synthetic yarn to the radiant heat.

3,607,560
APPARATUS FOR MAKING MONOFILAMENT FIBER OPTIC RIBBONS FOR COHERENT FIBERSCOPES
William F. Peck, Sturbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed May 15, 1969, Ser. No. 824,764
Int. Cl. B65h *65/00*
U.S. Cl. 156—433 6 Claims

Monofilament optical fiber ribbons are formed by winding fiber convolutions one over another throughout a short section of the length of each ribbon, bringing the convolutions

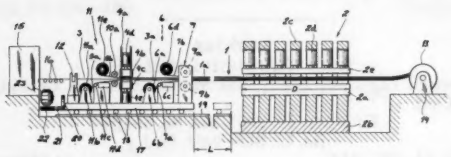
into accurately superimposed parallel relationship in said section of the ribbon and cementing across the section to hold same intact for assembling and cementing together corresponding sections of a number of the ribbons as a fiberscope body.



3,607,561
APPARATUS FOR THE MANUFACTURE OF REINFORCED FLEXIBLE BELTS

Gerhard Hutz, Suchteln/Rhineland, and H. J. Bongers, Huls, near Krefeld, both of Germany, assignors to G. Siempelkamp & Co., Krefeld, Germany

Filed Jan. 25, 1967, Ser. No. 611,626
Claims priority, application Germany, Jan. 26, 1966, S 101638
Int. Cl. B29h *9/00*
U.S. Cl. 156—437 **4 Claims**



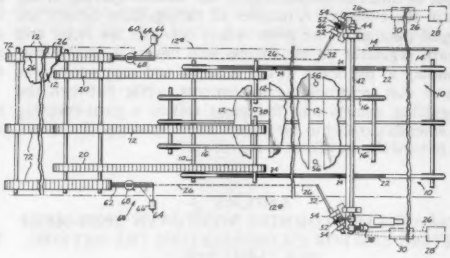
System for the production of steel-wire-reinforced flexible belts consisting at least of an elastomeric or synthetic-resin upper layer, a core in which the steel strands are embedded and a lower layer of such material bonded into a unitary laminate while the reinforcing strands are tensioned; the invention resides in the use of an equalizing press adapted to bond the core to the steel strands prior to the application of the upper and lower layers and the final laminating phase. A supply means for each of the outer layers is provided downstream of the equalizing press and the layer is, in turn, downstream of a further supply system adapted to sandwich the generally planar array of longitudinally extending tension steel strands between layers of the core material.

3,607,562
APPARATUS FOR FASTENING SLATS TOGETHER EDGE-TO-EDGE

Roderick L. Brenneman, Corvallis, and Daniel M. McLean, Independance, both of Oreg., assignors to Georgia-Pacific Corporation, Portland, Oreg.

Filed Aug. 13, 1968, Ser. No. 752,285
Int. Cl. E06b *9/26*
U.S. Cl. 156—439 **8 Claims**

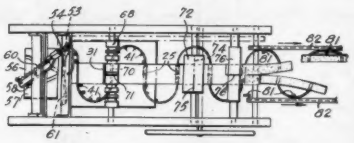
Substantially rectangular sheets are fastened together edge-to-edge by arranging the sheets in spaced relation, arranging a pair of continuous strings, one above and one below the sheets, traversing the strings and the spaced sheets relative to each other, crisscrossing the strings sequentially at each between-sheet space, crowding the sheets together edgewise, and fastening the crisscrossed strings to the sheets, thereby fastening the sheets together in a continuous strip.



3,607,563
BAG HANDLE FORMING MACHINE

John Bagnall, 1785 Caledonia Road, Mount Royal, Quebec, Canada

Filed Aug. 22, 1967, Ser. No. 662,399
Int. Cl. B65h *17/00*
U.S. Cl. 156—439 **4 Claims**

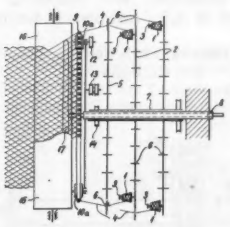


The present invention relates to the formation of bag handles by laying a handle rope into a sinusoidal curve over a glued tape with the tape forming the axis of the curve and then superimposing the second tape over the first tape and severing the tapes along said axis and finally alternatively separating formed handles from opposite sides of said axis.

3,607,564
APPARATUS FOR THE PRODUCTION OF TEXTILE MATERIALS WHICH ARE NOT KNOTTED AND ARE NOT WOVEN

Istvan Rasko, Budapest, Hungary, assignor to Jarmufejlesztesi Intezet, Budapest, Hungary

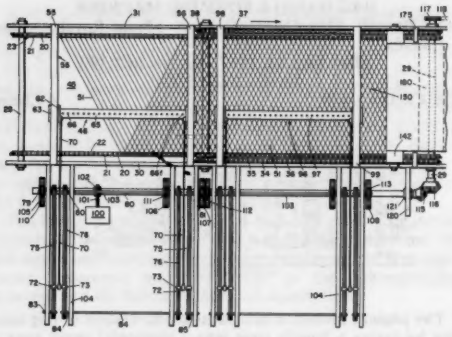
Filed Oct. 5, 1967, Ser. No. 673,217
Int. Cl. B65h *57/16*
U.S. Cl. 156—441 **5 Claims**



An apparatus for the production of textiles which are neither knotted nor woven. According to the invention, the yarns which are to be formed into the textile cross each other and are joined together at their crossing points where they contact each other, either by welding of the yarns to each other or by adhering them to each other at their crossing points. The apparatus includes a pair of press rollers, the length of which corresponds to the width of the material which is produced, and a spindle, which extends at right angles to the press rollers upstream of the latter, carries a bat-

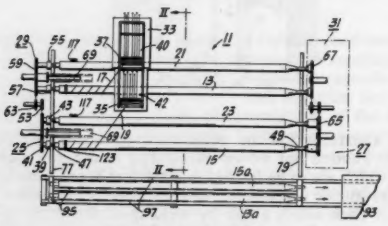
tery of spindles, on each of which a spool of yarn is mounted. A thread or yarn regulator is disposed between the press rollers and the battery of yarn spools, and this regulator has a number of holes corresponding to the desired spacing in the yarns in the material. A number of yarn-guiding eyelets are arranged parallel to the press rollers between the latter and the yarn regulator on an endless belt having a length corresponding to the width of the material and supported so as to carry out reciprocating movements, while between the yarn-guiding eyelets and the press rollers a yarn-coupling head extends paraliel to the rollers and is mounted for movement toward the way from these rollers.

3,607,565
APPARATUS FOR FORMING NONWOVEN OPEN-MESH NETTING AND FOR INCORPORATING THE NETTING IN A LAMINATE
Mark S. Eaton, Rte. 1, Box 812, Bonita Spring, Fla.
Filed Apr. 11, 1969, Ser. No. 815,409
Int. Cl. D04h *3/05*
U.S. Cl. 156—440 **18 Claims**



An apparatus for forming a nonwoven open-mesh netting which has at least one pair of forwardly moving parallel rows of pins and a traversing shuttle which loops a plurality of strands around the pins. As the pins advance in one horizontal plane and the shuttle moves back and forth from one row of pins to the other in another horizontal plane, the strands are crisscrossed to form the netting. Means are provided to achieve positive anchoring of the strands on the pins. The apparatus also includes means to incorporate the netting thus formed into a laminate.

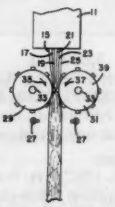
3,607,566
FILAMENT-WINDING APPARATUS
Jonas Medney, Oceanside, and Donald J. Baumgarten, Smithtown, both of N.Y., assignors to Koppers Company, Inc.
Filed Dec. 18, 1968, Ser. No. 784,812
Int. Cl. B65h *54/00*
U.S. Cl. 156—446 **10 Claims**



Filament-winding apparatus includes rotatable elements mounting supports between which mandrels, on which filament rovings are to be wound, are mounted. A winding head reciprocates along the length of the mandrel located at a winding station. When wound, the elements are rotated to place an unwound mandrel in the winding position. After the filament roving is severed, a wrap-cylinder helps to start to wrap or wind the filament roving on the unwound mandrel, while the wound mandrel is removed, moved into a curing oven, and replaced by an unwound mandrel.

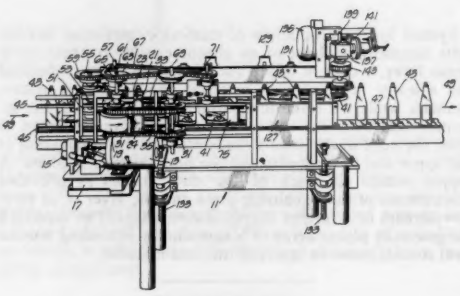
A plurality of supports mounted adjacent a pair of winding heads operated simultaneously make it possible to wind two mandrels simultaneously.

3,607,567
APPARATUS FOR NONWOVEN FABRIC MANUFACTURE
Theodore H. Fairbanks, West Chester, Pa., assignor to FMC Corp., Philadelphia, Pa.
Filed Jan. 2, 1968, Ser. No. 695,007
Int. Cl. D04h *3/02*
U.S. Cl. 156—441 **4 Claims**



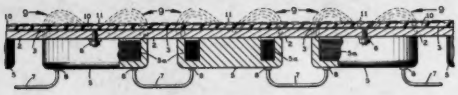
Apparatus for making of nonwoven fabrics formed of strands which are bonded to each other at selected locations concomitantly with the extrusion thereof.

3,607,568
ROLL-THROUGH LABELER
Herman Laub, III, 244 N. San Marino Ave., San Gabriel, Calif.
Filed Dec. 29, 1967, Ser. No. 694,507
Int. Cl. B65c *9/02, 9/22*
U.S. Cl. 156—453 **14 Claims**



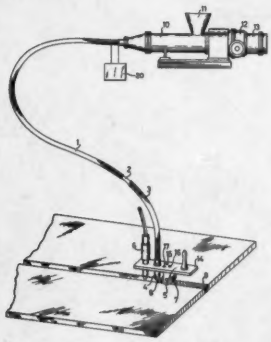
An electromechanical labeling machine is disclosed for automatically pasting labels on containers as they are moved, as by a rolling movement, past a labeling mechanism. As the containers move along a conveyor, they pick up glue in a configuration corresponding to that of the label that is to be applied. The glued surface of the container then registers with a label in the labeling mechanism and the label adheres to the container.

3,607,569
MAGNETIC MOLD MEANS FOR MOLDING STEEL-REINFORCED HOLLOW BODIES
Joseph L. Greenwell, 8320 S.W. 151 St., Miami, Fla.
Filed Mar. 24, 1969, Ser. No. 809,581
Int. Cl. B29c 3/00
U.S. Cl. 156—500 10 Claims



A mold of uniform thickness of nonmagnetic material for molding steel-reinforced laminar self-curing semifluid material into open side hollow bodies of substantially uniform thickness including a plurality of magnets distributed around the nonmolding side of the mold for urging by magnetic attraction through the mold perforated expanded or reticular steel reinforcement material into intimate and uniform engagement with each of a plurality of semicured layers of the molding material sequentially applied to the molding side of the mold to form a laminar steel-reinforced body of predetermined substantially uniform thickness when the material is cured.

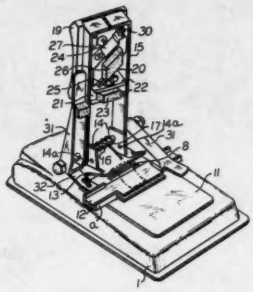
3,607,570
APPARATUS FOR WELDING ARTICLES MADE OF THERMOPLASTIC MATERIALS
Joachim Hildebrandt, Hattersheim (Main), and Oskar Kunze, Langenhein/Taunus, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany
Filed Nov. 7, 1967, Ser. No. 681,224
Claims priority, application Germany, Nov. 12, 1966, F 50663
Int. Cl. B29b 3/02, 5/04; B32b 31/30
U.S. Cl. 156—500 2 Claims



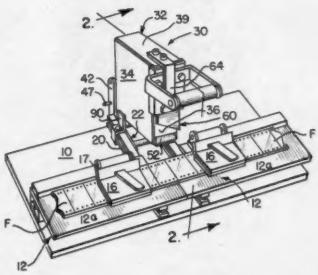
Thick-walled articles made of thermoplastic materials are welded by means of a welding apparatus comprising a screw extruder, a heated flexible conduit, a heated mouthpiece and a guiding device.

3,607,571
TAPE CUTTER AND SPLICER
Toshiharu Tange, Tokyo, Japan, assignor to Robins Industries Corporation, Flushing, N.Y.
Filed Dec. 4, 1967, Ser. No. 687,577
Int. Cl. B31f 5/06; G03d 15/04
U.S. Cl. 156—505 3 Claims

A tape-splicing device in which a pressure lever is pivotally mounted over an anvil on a hollow baseboard. A slide assembly on the pressure lever supports a tape-cutting knife, and a pair of trimming knives, with said knife or knives being selectively positionable over the anvil. A click stop on the slide assembly is provided to ensure correct orientation of the knife or knives with respect to the anvil. The anvil is formed with tape guides for orienting the tape to be spliced, and the hollow baseboard is provided with an adhesive tape-supporting reel, tape-orienting guideposts to direct the adhesive tape from the reel to a delivery opening in the baseboard, and over a tape guide spring from which the tape is fed over the anvil, so that the adhesive splicing tape is maintained in a relatively dust-free condition, subject to being readily fed to the anvil for positioning over the tape to be spliced, after the tape to be spliced has been appropriately severed and positioned on the anvil.



3,607,572
TAPE-APPLYING MECHANISM
Leif G. Jorgensen, 517 W. St. Charles Road, Lombard, Ill.
Filed Dec. 14, 1967, Ser. No. 690,477
Int. Cl. B32b 31/18; B31f 5/06
U.S. Cl. 156—505 15 Claims

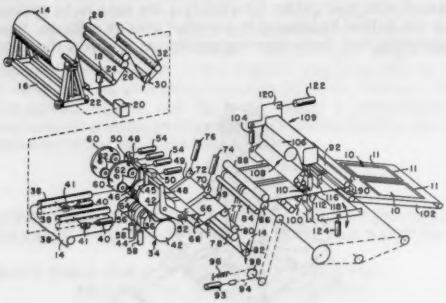


A device for applying a strip of adhesive tape to an article comprising: a base having a platform for holding the article; a carriage movable laterally on the base; an operating member pivoted to the carriage having means for carrying, dispensing, and cutting the tape; means for releasing the operating member and cutting means from inoperative positions; and means for releasing the locking means responsive to predetermined lateral movement of the operating member and carriage.

3,607,573
SEALED EDGE MACHINE
Andreas M. Michaelides, Wellford, and Charles A. Wethington, Spartanburg, both of S.C., assignors to Deering Milliken Research Corporation, Spartanburg, S.C.
Filed June 20, 1969, Ser. No. 835,187
Int. Cl. B32b 31/18, 31/20
U.S. Cl. 156—511 4 Claims

Apparatus to automatically provide severed sealed edge products to prevent unraveling. The machine is so designed

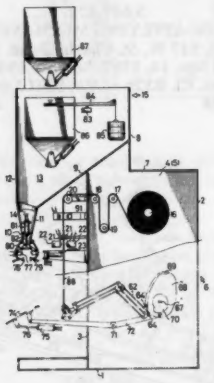
to automatically hold the fabric during formation and to automatically guide the fabric during the advancing stage of the fabric prior to the formation of subsequent sealed edge products.



3,607,574
AUTOMATIC PACKAGING APPARATUS

Toshihiko Satake, 2-38, Nishihon-machi, Saijyocho, Kamogun, Hiroshima, Japan

Filed July 8, 1969, Ser. No. 839,868
Claims priority, application Japan, July 11, 1968, 43-48906
Int. Cl. B32b *31/20;* **B65b** *1/02*
U.S. Cl. 156—515 **4 Claims**



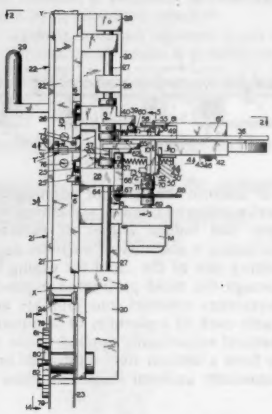
A packaging machine utilizing a tubular plastic film material whereby the tubular material is formed into a bag and the bag is filled and sealed, all of these operations being performed on the machine. The apparatus includes a parallelogram linkage and gripper jaws for transferring the formed tubing, by its severed end, from the severing position to the material filling position, slackening the lateral margins of the tubing so that vacuum cups can hold them open during filling, and then tightening the margins so that the bag can be filled.

3,607,575
DEVICE FOR CONNECTING SUCCESSIVE STRIPS OF FILM FOR PROCESSING

Donald W. Byers, and Chester H. Petry, Jr., both of Portland, Oreg.

Filed Jan. 10, 1968, Ser. No. 696,804
Int. Cl. G03d *15/04*
U.S. Cl. 156—506 **3 Claims**

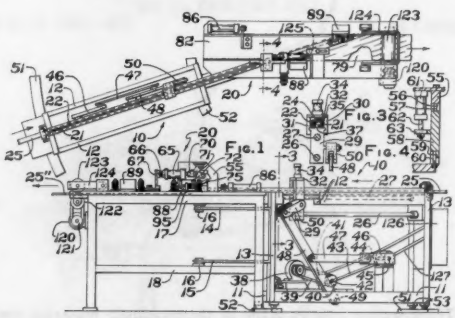
A device for facilitating the attaching of one strip of photographic film onto the end of another for convenience in enabling separate strips of film to be processed, printed duplicated, etc. as a single continuing strip; the operation of the device causing overlapping ends of a pair of consecutive strips of film positioned thereon to be trimmed and connected together by a short length of pressure tape which is automatically cut off by the device from a tape supply roll and applied against the trimmed ends of the strips.



3,607,576
WIRE OVERHEAD MACHINE

Ronald W. Phillips, Tallmadge, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed Dec. 18, 1969, Ser. No. 886,410
Int. Cl. B65h *69/06;* **G03d** *15/04*
U.S. Cl. 156—507 **6 Claims**



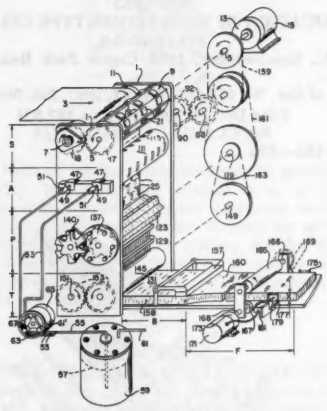
A machine for fabricating a continuous web of bias-formed wire overhead material having a tape-index-feeding device cooperative with a cutting device which cuts a predetermined amount of tape onto a carrier member of a splicing table. The splicing table is subject to being magnetized to flatten and condition the wire tape for splicing to the wire overhead being formed. The magnetization of the table moves a hold-down bar and guide means into contact with the formed wire overhead maintaining the previously spliced material in position while cooperating with the carrier member to assure an effective butt splice.

3,607,577

FABRICATION OF HONEYCOMB-TYPE CELLULAR MATERIALS

Robert C. Geschwender, 1800 Center Park Road, Lincoln, Nebr.

Division of Ser. No. 652,555, July 11, 1967, Pat. No. 3,528,334.
Filed Dec. 24, 1969, Ser. No. 887,985
Int. Cl. B32b *31/12*; B31d *3/02*
U.S. Cl. 156—548 9 Claims



A strip or web of suitable material, such as treated kraft paper, metal foil or the like is drawn between rolls of a slitter, so designed that by means of a very simple adjustment the finished product may have a selected one of a number of sizes and angles of honeycomb-type cells. After slitting, the strip passes through an adhesive applicator having outlets to imprint staggered areas of adhes ve on opposite sides of the strip between rows of slits. The applicator is constructed to prevent access of air to the adhesive during its travel from a supply to the imprinting region thus preventing premature setting of the adhesive and clogging of moving parts. Next the slitted web with applied adnesive passes between substantially spaced folding wheels which will accept strips of various thicknesses for pleating and designed to minimize smearing of the adhesive. As the strip passes through the folding wheels the adhesive spacedly joins adjacent pleats. After the pleated material leaves the pleating wheels it is sent to braking apparatus which forms a compaction wherein the adhesive sets. Then the material is drawn from the compaction by pulling apparatus to stretch it, thereby forming the honeycomb-type cells. As the cellular band is pulled its width becomes less. Width-sensing means provides a signal indicating any deviation from a desired width. This signal is applied to control means for the speed of operation of the pulling apparatus to compensate for any incipient deviation from the desired width.

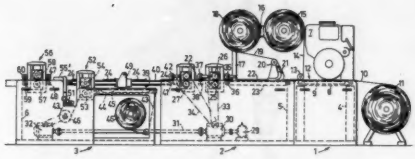
3,607,578

APPARATUS FOR PRODUCING DISPOSABLE DIAPERS

Bror Hugo Oolf Berg, Goteborg, and Erik Ragnar Johansson, Molndal, both of Sweden, assignors to Molnlycke AB, Goteborg, Sweden

Filed Apr. 8, 1968, Ser. No. 719,477
Claims priority, application Sweden, Apr. 12, 1967, 5091/67
Int. Cl. B32b *31/10, 31/18*
U.S. Cl. 156—552 4 Claims

An apparatus for producing disposable diapers, the absorption bodies of which are fastened to a sheet of plastic material shaped to conform to the body of the child, and serving as pants or diaper-holder whilst the diaper is in use. The apparatus having means which continuously produce and/or advance finished absorption bodies, means for advancing and combining a plastic web with gradually advanced absorption bodies and means positioned in the direction of movement of the plastic web and intended to provide the two side edges of the plastic web with recesses which impart to the finished diaper-holder a shape which conforms to the body of the child. The apparatus also having means arranged along the path of movement of the plastic web for applying adhesive on said web at positions where the absorption bodies are



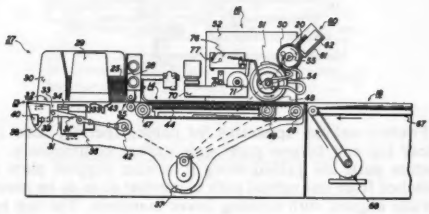
fastened thereto and pressure means arranged at the position where the absorption bodies and the plastic web meet and intended to press the bodies onto the adhesive-coated positions on said plastic web. After this pressure means cutting means, for instance a roll pair provided with knives, being arranged for clipping the plastic web into lengths appropriate for the intended diaper-holder.

3,607,579

LABELING APPARATUS FOR MULTISHEET LABELS

Albert G. Enskat, Barrington, and Donald W. Kroening, Mundelein, both of Ill., assignors to Xerox Corporation, Rochester, N.Y.

Filed July 14, 1969, Ser. No. 841,320
Int. Cl. B32b *31/20*; B05c *1/02*
U.S. Cl. 156—571 8 Claims



An article-labeling system having an article supply means; a labeling head including a label transfer wheel; a source of labels of the type comprising one or more information-bearing sheets projecting from a common stem; means to apply adhesive to the label stems to enable the transfer wheel to affix the labels to the articles by their stems; and means operable on the label sheets to prevent the label sheets from contacting the adhesive-applying means to avoid application of adhesive to the label sheets and undesired adhering of the label sheets to the articles and/or to one another.

3,607,580

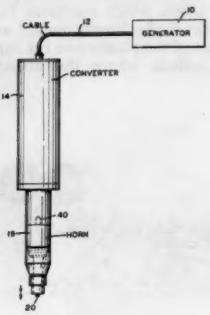
TOOL HAVING PENETRATION LIMITING MEANS FOR JOINING THERMOPLASTIC PARTS BY SONIC OR ULTRASONIC ENERGY

Edward G. Obeda, Brookfield, Conn., assignor to Branson Instruments, Incorporated, Stamford, Conn.

Filed Feb. 24, 1969, Ser. No. 801,658
Int. Cl. B32b *31/16*; B29c *27/08*
U.S. Cl. 156—580 8 Claims

A solid horn for sonic or ultrasonic energy transfer is provided with a sleeve assembly adapted to engage the work-

piece to which the horn transfers energy. The sleeve as-



sembly limits the penetration of the horn tip into the workpiece.

3,607,581

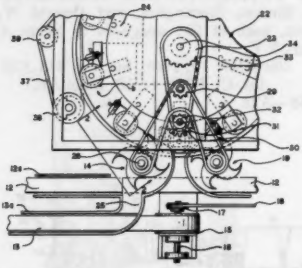
SPIN-WELDING HOLDER AND LOADING APPARATUS

Gary A. Adams, Beaverton, Mich., assignor to Koehring Company, Milwaukee, Wis.

Filed June 5, 1969, Ser. No. 830,668

Int. Cl. B30b *3/04;* **B29c** *27/08*

U.S. Cl. 156—580 **18 Claims**



Friction-welding apparatus for joining thermoplastic container top and bottom parts which move continuously. The bottom parts are guided along a vacuum support plate and switched from one orbital path to another so as to be concentrically aligned with orbiting lower mandrels. The top parts are moved gradually up into the loops of holder bands which are tightened to positively grip them during the friction-welding operation.

3,607,582

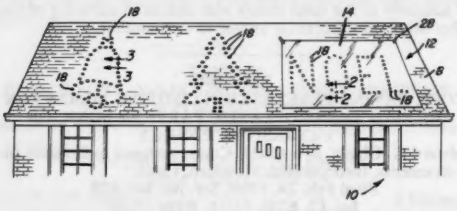
AREA OUTLINING GUIDE FOR WALL OR ROOF

Mark W. Horacek, P.O. Box 12047, Houston, Tex.

Filed Aug. 21, 1969, Ser. No. 852,006

Int. Cl. B32b *7/14;* **B44d** *3/30*

U.S. Cl. 156—584 **6 Claims**



An area marking guide for use when one is called upon to plan and display an attractive seasonal message or simulated design on the viewable surface of a building roof or a wall. It comprises a prefabricated manually applicable and removable sheet material template which is capable of being placed flatwise atop a predetermined or selected roof ara and temporarily held or fastened in a given position The sheet has means which functions to permit the user to map-out , amrk and outlet the desird characterand, in so doing, to facilitate positioning and fastening a string of Christmas tree lights or reflective ornaments on said surface conforming with the outlined area.

3,607,583

FABRICATION OF HONEYCOMB-TYPE CELLULAR MATERIALS

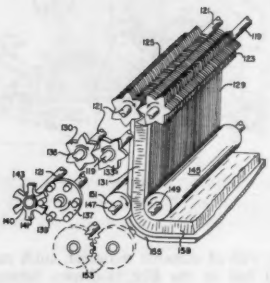
Robert C. Geschwender, 1800 Center Park Road, Lincoln, Nebr.

Division of Ser. No. 652,555, July 11, 1967, Pat. No. 3,528,334.

Filed Dec. 24, 1969, Ser. No. 887,821

Int. Cl. B31f *1/22;* **B65h** *45/16*

U.S. Cl. 156—596 **5 Claims**



A strip or web of suitable material, such as treated kraft paper, metal foil or the like is drawn between rolls of a slitter, so designed that by means of a very simple adjustment the finished product may have a selected one of a number of sizes and angles of honeycomb-type cells. After slitting, the strip passes through an adhesive applicator having outlets to imprint staggered areas of adhesive on opposite sides of the strip between rows of slits. The applicator is constructed to prevent access of air to the adhesive during its travel from a supply to the imprinting region thus preventing premature setting of the adhesive and clogging of moving parts. Next the slitted web with applied adhesive passes between substantially spaced folding wheels which will accept strips of various thicknesses for pleating and designed to minimize smearing of the adhesive. As the strip passes through the folding wheels the adhesive spacedly joins adjacent pleats. After the pleated material leaves the pleating wheels it is sent to braking apparatus which forms a compaction wherein the adhesive sets. Then the material is drawn from the compaction by pulling apparatus to stretch it, thereby forming the honeycomb-type cells. As the cellular band is pulled its width becomes less. Width-sensing means provides a signal indicating any deviation from a desired width. This signal is applied to control means for the speed of operation of the pulling apparatus to compensate for any incipient deviation from the desired width.

3,607,584

LAMINATED LIGHTWEIGHT REFELCTOR STRUCTURES

Cletus A. Becht, Akron, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

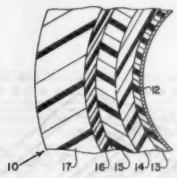
Filed Mar. 4, 1968, Ser. No. 710,300

Int. Cl. G02b *5/08;* **B32b** *15/08;* **B29d** *27/00*

U.S. Cl. 161—4 **3 Claims**

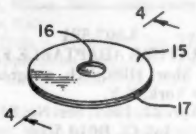
A method for forming a complex curved structure and the structure itself which is essentially directed towards making lightweight reflectors for use as mirrors or radar antennae. Essentially the process involves capturing a complex geomet-

ric shape with a thin layer of cured high density resin, depositing a lightweight resin foam on the back of the thin resin layer, and curing the foam to retain the desired geometric shape to the resin layer and provide an extremely lightweight structure. The foam can be in one or more laminated layers to give greater structural rigidity properties, or dent-resistance. A resin impregnated fiberglass material



covers the back of the laminated structure to provide structural integrity. The composite product is up to 10 times lighter than similar metallic or glass structures, and has extremely good optical qualities when formed for mirror surfaces. A thin reflective metallic coating can be deposited after the entire laminate is formed, or it can be deposited onto a thin plastic sheet which in turn is laminated to the formed resin layer.

3,607,585
PRINTED CIRCUIT BOARD ARTWORK PAD
Art E. Cassingham, Los Altos, and Arvin C. Skyrud, Milpitas, both of Calif., assignors to Sylvania Electric Products Inc.
Filed Nov. 29, 1968, Ser. No. 779,846
Int. Cl. B41m *3/08*; B32b *3/10*
U.S. Cl. 161—6 **5 Claims**



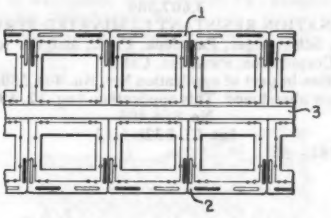
Artwork for printed circuit boards with plated-through holes is made with terminal area pads having center openings covered with an optical filter, preferably a colored strip. These pads permit photographic techniques to be used in making circuit pattern transparencies with and without pad center hole images and thus simplify this part of the process of making such printed circuit boards. The pads are formed by successively punching center openings in a continuous sheet of pad material, adhesively pressing a like sheet of filter material against the perforate sheet, cutting the pad shape in the double laminate, and removing the severed pads from the parent stock.

3,607,586
BRANCH OF WOUND PLASTIC RIBBON FOR ARTIFICIAL CHRISTMAS TREES
Chester Peter Hankus, 12346 Throop St., Calumet Park, Ill.
Filed Nov. 5, 1968, Ser. No. 773,515
Int. Cl. 156 *195*; A47g *33/06*
U.S. Cl. 161—24 **5 Claims**

Branch for artificial Christmas tree in which a metal rod having a slit extending across the top of the rod receives the end of a bead of a needled ribbon of plastic or metal foil wound about the rod in the general form of the spiral from the top to the bottom of the rod. The ribbon has a narrow bead extending along one side of the ribbon and fitting into a slot in the rod and wound about the rod and bent relative to the plane of the needled ribbon to place a twist in the needles of the ribbon when wound spirally about the rod. The needles of the ribbon are formed in side-by-side relation by slits extending transversely of the bend and at equal leading angles relative to the bead. The ends of the needles are forked

by slitting from the ends thereof to increase the appearance of fullness of the branch.

3,607,587
A CHAIN OF PHOTOGRAPHIC TRANSPARENCY FRAMES CONNECTED TOGETHER BY A FLEXIBLE TAPE
Herbert R. Langkopf, 234 Furstenwall, 4000 Dusseldorf, Germany
Filed Sept. 27, 1968, Ser. No. 763,282
Claims priority, application Germany, Oct. 4, 1967, L 45 737
Int. Cl. B32b *3/16*
U.S. Cl. 161—39 **4 Claims**



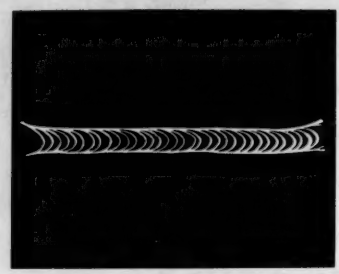
This disclosure relates to a chain of photographic transparency frames which are adapted for feeding into a processing machine comprising a plurality of generally rectangular transparency frames arranged in side-by-side and end-to-end relationship with transversely adjacent side-by-side transparency frames being connected to each other by a flexible tape to produce a chainlike effect by being adhered in overlying relationship to marginal side edges of the transparency frames. The flexible nature of the tape permits transversely adjacent transparency frames to be swung, folded or hinged into overlying relationship to each other to encapsulate therebetween an associated photographic transparency, i.e., a photographic negative or the like. The tape preferably includes pressure sensitive or similar adhesive media on the surface thereof opposing the transparency frames, although in another embodiment of the invention both sides of the tape are provided with adhesive to fixedly secure each transparency to an associated frame prior to overfolding transversely adjacent frames into interlocked relationship. In accordance with a further embodiment of the invention each frame includes a "transparency area" inboard of marginal edges of the frame and the tape includes adhesively coated tonguelike projections disposed in the "transparency area" such that each transparency will be fixedly secured in a "-transparency area" by the projections.

3,607,588

NONWOVEN FIBROUS PRODUCTS AND METHODS AND APPARATUS FOR PRODUCING SUCH PRODUCTS

John W. Soehngen, Berkeley Heights, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Sept. 21, 1966, Ser. No. 580,994
Int. Cl. D03d 27/00; B32b 3/12
U.S. Cl. 161—53 13 Claims



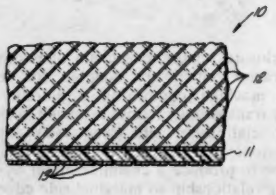
1. A nonwoven fibrous product comprising a series of similar fibrous subassemblies each made up of randomly arranged fiber components bonded together in the form of a thin sheet, each of said subassemblies including top and bottom zones extending generally parallel to the surfaces of the product and an intermediate zone extending angularly with respect to the surfaces of the product, the top and bottom zones of a plurality of adjacent ones of said subassemblies being disposed in overlapping and contacting relation to each other to provide the product with surface strata of substantial density, and major portions of the intermediate zones of adjacent subassemblies being spaced apart from each other.

3,607,589

DELAMINATION RESISTANT LAMINATED STRUCTURE

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Air Logistics Corporation, Pasadena, Calif.

Continuation-in-part of application Ser. No. 406,350, Oct. 26, 1964, now abandoned. This application Aug. 12, 1969, Ser. No. 866,405
Int. Cl. B32b 5/12
U.S. Cl. 161—55 7 Claims



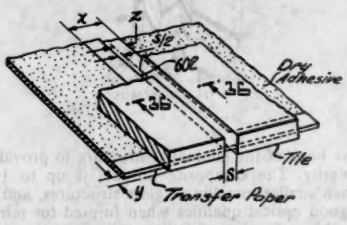
A laminated structure capable of sustaining local deformations to compound curvature without delamination including a central sheetlike layer of elastomeric material and a plurality of spaced parallel tensile elements bonded to each opposite side of the central layer. The tensile elements are fabricated of a material which, if provided in sheet form, would be susceptible to delamination upon local deformation to compound curvature. The tensile elements have a width parallel to the sheet greater than their thickness normal to the sheet. The tensile elements on one side of the sheet are aligned at a predetermined angle to the length of the tensile elements bonded to the opposite side of the sheet. The elastomeric core of the laminated structure absorbs interlaminar shear between the tensile elements and prevents delamination of the structure when the structure is deformed locally to compound curvature.

3,607,590

TILE PRODUCT AND METHOD FOR MAKING THE SAME

Frank L. Califano, Hackensack, N.J., and Joseph Laszlo, New York, N.Y., assignors to The Flintkote Company, New York, N.Y.

Division of Ser. No. 528,569, Feb. 18, 1966. Filed June 16, 1969, Ser. No. 840,587
Int. Cl. B32b 3/02, 3/14
U.S. Cl. 161—39 1 Claim



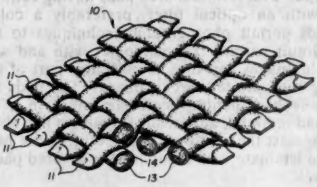
A tile product and a method for preparing an adhesive coated tile product with a protective sheet thereon which sheet is removed when the tile products are installed. The uncoated tile products are moved from a stack in succession by a conveyor at a constant speed and in uniformly spaced relationship and an adhesive coated web having an adhesive patch with an area less than the area of the tile product is applied over the moving tile products and bonded thereto. This web is then severed between each adjacent tile product by a cutting knife in such a manner as to provide an overlap of the web and the resultant adhesive bonded to the tile is set back from the tile edges.

3,607,591

TEMPERATURE ADAPTABLE FABRICS

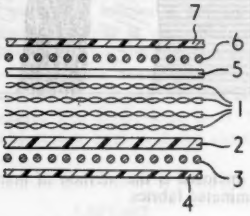
Ralph H. Hansen, Short Hills, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.

Filed Apr. 22, 1969, Ser. No. 818,323
Int. Cl. D01d 5/24
U.S. Cl. 161—77 10 Claims



This invention relates to novel fabrics characterized by thermal insulation properties which change in response to changes in environmental temperature. The fabrics contain hollow inflatable elements having entrapped therein a gas and a solvent material which can be converted from liquid to solid phase by temperature changes within the environment of usage, said solvent material dissolving more of the gas when in the liquid phase than in the solvent phase. The elements contain more gas than can be dissolved by the solvent material within the elements when this material is in the solid phase and thus lowering the environmental temperature, so as to convert said material from the liquid to the solid phase, results in the expulsion of gas formerly dissolved in the liquid phase. The expelled gas inflates the inflatable elements within the fabric and increases the thermal-insulating properties of the fabric.

3,607,592
PORTABLE PLATFORMS
Peter J. Jenkins, Burscough, England, assignor to Dunlop Rubber Company Limited, London, England
Continuation of application Ser. No. 505,503, Oct. 28, 1965, now abandoned. This application Dec. 18, 1969, Ser. No. 886,416
Int. Cl. B32b *5/12, 25/10*
U.S. Cl. 161—57 5 Claims

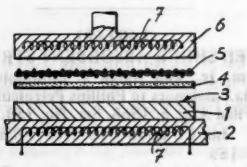


Portable platform for use, for example, as a temporary road, comprising a flexible plastic material in which is embedded a composite reinforcement comprising two layers of parallel transverse metal cords and sandwiched between the two layers a layer of textile reinforcement and a layer of longitudinal parallel metal cords, the layer of longitudinal cords lying between the textile reinforcement and the load-bearing surface of the platform so that "one way" longitudinal rigidity is achieved.

3,607,593
POROMERIC MATERIAL HAVING HIGH PERMEABILITY TO GASES
Dorino Semenzato, Milan, Italy, assignor to Montecatini Edison S.p.A., Milan, Italy
Filed Nov. 5, 1968, Ser. No. 773,664
Claims priority, application Italy, Nov. 7, 1967, 22394 A/67
Int. Cl. B32b *5/22, 5/32*
U.S. Cl. 161—87 6 Claims

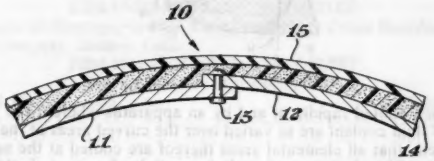
Poromeric material that is impermeable to water but permeable to gases such as air and water vapor. Material comprises a backing fabric, a first foamed layer of a vinyl polymer containing another polymeric material incompatible therewith, this first layer being bonded to the fabric, and a second layer similar to the first layer and bonded thereto, the second layer being foamed less than the first layer.

3,607,594
PROCESS FOR MAKING A SELF-LUBRICATING MATERIAL AND PRODUCTS OBTAINED THEREBY
Raymond Mancel, Paris, France, assignor to Societe Anonyme Societe d'Adaptation Industrielles et Commerciales des Mateires Plastiques, SAIMP, Paris, France
Filed May 16, 1967, Ser. No. 638,810
Int. Cl. B32b *5/00;* F16c *1/00*
U.S. Cl. 161—92 11 Claims



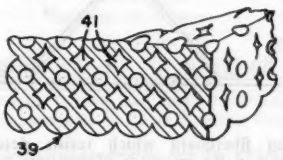
The self-lubricating material comprises a metal fabric completely impregnated with a thermoplastic material bonded to a metal support. The metal fabric and a sheet of the thermoplastic material are assembled on the metal support, the assembly is heated to a temperature sufficient to at least soften the thermoplastic material, after which pressure is applied to the assembly and maintained until after the latter has cooled, the pressure being sufficient to force the metal fabric into intimate contact with the metal support and to cause the thermoplastic material to fill the pores of the metal fabric and to adhere to the metal support.

3,607,595
METHOD OF PRODUCING AERODYNAMICALLY SMOOTH SURFACES
Leo J. Windecker, Midland, Tex., assignor to The Dow Chemical Company, Midland, Mich.
Filed May 31, 1966, Ser. No. 553,956
Int. Cl. B32b *3/00*
U.S. Cl. 161—119 6 Claims



Aerodynamically smooth surfaces are prepared by covering an irregular surface such as a riveted aircraft wing with a flexible foam embedded with a thermosettable resin. The foam has a smooth outer layer of resin. Pressure is applied to the smooth outer layer of resin to deform the foam layer and cover the surface irregularities.

3,607,596
CELLULAR ARTICLE
Theodore H. Fairbanks, West Chester, Pa., assignor to FMC Corporation, Philadelphia, Pa.
Filed July 10, 1968, Ser. No. 743,683
Int. Cl. B32b *3/00, 27/00, 31/30*
U.S. Cl. 161—122 4 Claims

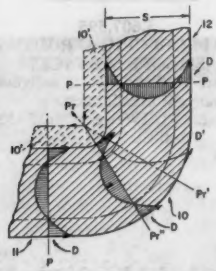


An article including generally parallel, elongated members at least some of which have bulbous portions along the lengths thereof which are bonded to adjacent of such members so that the members together provide an integral article. The elongated members are formed of polymeric material, the molecules of which are oriented at least along one of the longitudinal and transverse directions of the article.

3,607,597
METHOD OF AND APPARATUS FOR THE PRODUCTION OF TEMPERED GLASS ARTICLES OF CHANNELED OR U CROSS-SECTIONAL FORM AND ARTICLE FORMED THEREBY
Piero Ferretti, Milan, Italy, assignor to Vetreria Milanese Lucchini Pegego, Milan, Italy
Filed Apr. 21, 1969, Ser. No. 817,737
Claims priority, application Italy, Apr. 20, 1968, 15,566A/68
Int. Cl. C03b *27/00*
U.S. Cl. 161—125 16 Claims

Method and apparatus for production of articles of tempered glass in the form of channels of U-shaped cross sec-

tion. The articles are formed from a ribbon of molten glass emerging continuously from a furnace. The side edges of the ribbon are turned upwardly to form the channel having an internal radius at the curved portion connecting the bottom and sidewalls, which is small with relation to the thickness of the walls. The channel is severed into sections of desired lengths, each section is reheated to tempering temperatures,



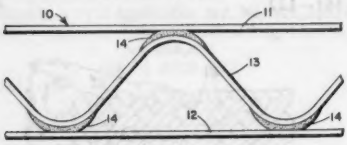
then cooled rapidly in and by an apparatus wherein the jets of fluid coolant are so varied over the curved areas of the article, that all elemental areas thereof are cooled at the same rate. Thereby are produced glass articles for use in building walls, etc., which display great strength against shattering and on breakage, fragment into very small, uniform and harmless pieces.

3,607,598

CORRUGATED FIBERBOARD

John R. LeBlanc, Wilbraham, Mass., and Robert W. Miller, Mentor, Ohio, assignors to Monsanto Company, St. Louis, Mo. and Alton Box Board Company, Alton, Ill., a part interest to each

Filed Sept. 26, 1969, Ser. No. 861,271
Int. Cl. B32b *3/28, 27/42;* **C08g** *37/18*
U.S. Cl. 161—133 **10 Claims**



Corrugated fiberboard which resists deterioration in strength when in the presence of moisture or water, and which has improved folding endurance. Such board is made by preliminarily treating medium and, optionally, liner members with a mixture of phenol-aldehyde resole resin and polyvinyl alcohol (and/or polyvinyl acetate and/or partially hydrolyzed such materials) and thereafter fabricating corrugated fiberboard from the so-treated members using a waterproof adhesive system containing polyvinyl alcohol, polyvinyl acetate, and/or phenol-aldehyde resin.

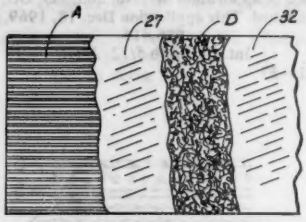
3,607,599

REINFORCED NONWOVEN LAMINATED FABRIC

George Bruce McPherson, Roper Mountain Road, Greenville, S.C.

Filed Nov. 15, 1967, Ser. No. 683,265
Int. Cl. B32b *3/16;* **D04h** *5/08*
U.S. Cl. 161—144 **2 Claims**

A nonwoven laminated fabric, such as a carpet, comprising a series of parallel warp strands coated with a latex binder and having a backing comprising randomly oriented scrim yarn and plastic sealing members. A modified form of the nonwoven laminated fabric or rug includes a series of parallel warp yarns having a backing which includes a first plastic sheet, a layer of randomly oriented scrim yarn, and a second plastic sheet providing a sealed backing. The layers of said laminated rug are secured together by a suitable bonding



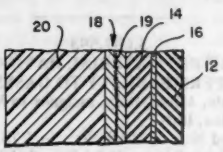
agent. Also, enclosed is the method of manufacturing such nonwoven laminated fabrics.

3,607,600

COMPOSITE MOLDING PROCESS AND PRODUCT

Robert E. Schreter, Lebanon, and John A. Marino, Palmyra, both of Pa., assignors to Hauck Manufacturing Company, Lebanon, Pa.

Filed July 15, 1969, Ser. No. 842,832
Int. Cl. B32b *7/04, 25/02, 25/04, 25/10*
U.S. Cl. 161—156 **16 Claims**



Strong, abrasion-resistant composite molded articles are produced that include a reinforced synthetic resin backing layer and an elastomeric surface layer that is molded to predetermined dimensions. The articles are molded by applying a first coating of an elastomer on a treated mold surface and then curing the elastomer just enough to produce a tack-free surface. A second coating of liquid elastomer is applied to the tack-free surface and fibers are deposited on the liquid coating of elastomer and worked to form a continuous fiber coating. Subsequently, at least one layer of reinforced synthetic resin is applied and rolled into the exposed surface of the fibers before the second elastomer coating solidifies. The fibers which extend from the second elastomer coating into the backing layer provide a strong mechanical bond that prevents separation of the elastomer layers from the synthetic resin. A porous reinforcing mat can be inserted into the first coating of elastomer while it is liquid to dramatically increase the article's tear strength and flexural strength.

3,607,601

FOAMED SHOCK-ABSORBENT STRUCTURE

Paul B. Milam, Jr., and Nolan J. Edmunds, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed Aug. 5, 1968, Ser. No. 750,342
Int. Cl. B32b *3/12, 7/02, 7/08*
U.S. Cl. 161—159 **12 Claims**

A shock-absorbent structure comprises a first foamed layer of a normally solid synthetic thermoplastic polymeric material, for example polyethylene, having a compressive strength at 10 percent deflection in the range of about 30 to about 200, and a second underlying layer of a flexible cellular rubber, for example flexible polyurethane.

3,607,602
METHOD OF AND A LAMINATED MATERIAL FOR PACKAGING ARTICLES

Eduard Greskiewicz, West Wyoming, Pa., assignor to Chemie-Industrie-Investment AG

Filed Aug. 4, 1967, Ser. No. 658,324
Claims priority, application Switzerland, Aug. 9, 1966, 11,704/66
Int. Cl. B32b 3/26, 7/12
U.S. Cl. 161—160 9 Claims

A method of packaging articles is provided whereby a laminated packaging material is assembled and wrapped around at least one article. The laminated packaging material comprises a heat-shrinkable thermoplastic resin film, a plastic foam layer, and an adhesive bonding material to attach the thermoplastic film to the foam layer. The wrapped article may be subjected to heat to shrink the thermoplastic resin.

3,607,603
TOY SLIDE

James C. Coverdale, Jr., Chadds Ford, Pa., assignor to Haveg Industries, Inc., Wilmington, Del.

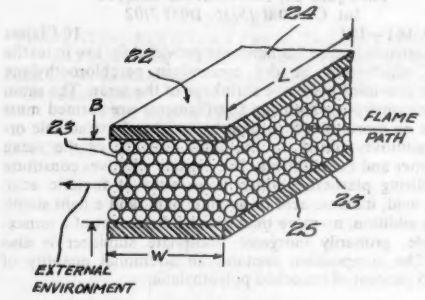
Filed Aug. 27, 1969, Ser. No. 853,484
Int. Cl. B32b 3/12, 7/02, 27/06
U.S. Cl. 161—160 1 Claim

A slide which comprises a resilient flexible plastic closed cell foam support with a linear or high density polyethylene film laminated thereto. The linear or high density polyethylene film is the sliding surface.

3,607,604
FLAME ARRESTER AND PRESSURE RELIEF

Robert D. Nava, 73 South Lodge Lane, Lombard, Ill.

Filed Nov. 19, 1969, Ser. No. 878,050
Int. Cl. B32b 3/12, 17/00
U.S. Cl. 161—161 12 Claims



The explosionproof enclosure of the invention has high performance characteristics in the functional area of flame arrest and pressure relief. The flame arrester which also functions as a pressure relief and water seal for the enclosure may be fabricated by bonding a top and bottom laminate to an interlaminate which is porous in a direction parallel to the top and bottom laminates. More particularly the interlaminate may be formed of a plurality of spheres so disposed in contacting relation as to provide a flame path between the environment within the enclosure and the atmosphere outside the enclosure.

3,607,605
COMPOSITE BUILDING MATERIAL

Kazuo Suzukawa, Koga-gun, Shiga-ken, Japan, assignor to Toray Engineering Co., Ltd., Osaka-shi, Osaka, Japan

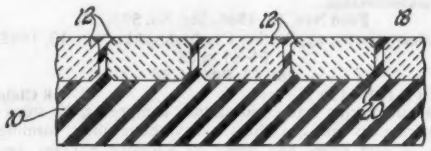
Filed June 16, 1967, Ser. No. 646,506
Claims priority, application Japan, June 23, 1966, Nov. 14, 1966 41/40385, 41/104475
Int. Cl. B28b 1/50
U.S. Cl. 161—161 6 Claims

An improved composite building material, which comprises a pair of laminar articles, a core material made of mixed paste of foaming cement containing fibrous materials infused into a determined intervening space between the laminar articles for composing them, and plurality of connecting blocks positioned in the space when stronger bonding required.

3,607,606
CERAMIC-RUBBER COMPOSITES

Duane H. Beninga, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.

Filed May 16, 1967, Ser. No. 643,787
Int. Cl. B32b 5/16, 25/02, 15/06
U.S. Cl. 161—162 4 Claims

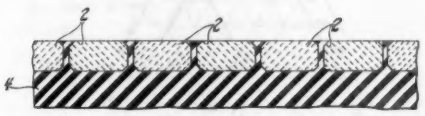


A composite of rubber, natural or synthetic, and alumina-base ceramic, useful as a wear-resistant lining for ball mills, conveyors, chutes and the like, comprising a layer of rubber having embedded in and bonded to the surface thereof closely spaced shaped bodies of alumina-base ceramic. Such composite is made by molding and thereby bonding the rubber material to the shaped alumina-base ceramic bodies either directly or preferably through an intermediate bonding layer applied to the ceramic bodies prior to the molding operation.

3,607,607
ORGANIC RESIN CERAMIC COMPOSITE AND METHOD FOR MAKING SAME

Duane H. Beninga, Golden, and Hugh P. Gibbons, Boulder, both of Colo., assignors to Coors Porcelain Company, Golden, Colo.

Continuation-in-part of application Ser. No. 638,879, May 16, 1967, now abandoned. This application May 27, 1968, Ser. No. 736,527
Int. Cl. B32b 15/08, 25/02, 27/04
U.S. Cl. 161—168 17 Claims



A composite of organic resin, preferably an elastomer, and ceramic useful for wear-resistant linings for ball mills, conveyors or chutes for abrasive materials, truck bed linings and the like comprising ceramic pieces with metallized surfaces and with the organic resin bonded to the metallized surfaces of the ceramic, the metallized surfaces being applied to the ceramic by contacting the ceramic with metal, preferably titanium or zirconium with sufficient force and relative motion to cause the metal to be bonded to the ceramic.

3,607,608

FIBER-REINFORCED CERAMICS

August C. Siefert, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation

Filed Jan. 17, 1966, Ser. No. 520,871
Int. Cl. C04b 35/70
U.S. Cl. 161—170 6 Claims

A composite having high strength and impact resistance comprising from 30 to 90 percent by volume of a glassy material from the group consisting of the following approximate formulations given in approximate percentages by weight: 4% SiO_2, 3% Al_2O_3, 10% B_2O_3, 83% PbO; and 28.7% SiO_2, 9.1% CaO, 11.77% Na_2O, 26.3% B_2O_3, 5.3% ZnO, 17.2% BaO, and 3.1% F_2; and having from 10 to 70% by volume of stainless steel fibers, boron fibers, or graphite fibers.

3,607,609

ARTIFICIAL LEATHER MADE OF COLLAGEN FIBERS MIXED WITH SYNTHETIC FIBERS AND METHOD OF MAKING SAME

Ladislav Bogdanovicz, Kunovice; Zdenek Eckmayer, Otrokovice; Zdenek Hrabal, Otrokovice; Radko Krcma, Brno; Vaclav Mrstina, Brno; Antonin Pavlik, Strelice, and Rudolf Vilcek, Oldrichovice, all of Czechoslovakia, assignors to SVIT, Narodni Podnik, Gottwaldov, Czechoslovakia

Filed Nov. 10, 1966, Ser. No. 593,289
Claims priority, application Czechoslovakia, Nov. 13, 1965, PV 6776/65
Int. Cl. D04h 1/30
U.S. Cl. 161—170 8 Claims

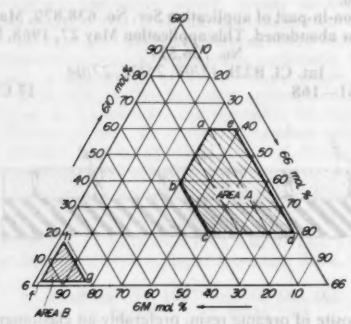
Manufacturing leather substitutes comprising the steps of preparing dry collagen fibers and synthetic fibers, forming a web of said fibers and apply an adhesive bonding agent thereto to produce a web having fibers in three dimensional pattern.

3,607,610

CRIMPED COMPOSITE FILAMENTS OF POLYCAPROLACTAM OR POLYHEXAMETHYLENE ADIPAMIDE, AND A TERPOLYAMIDE OF E-CAPROLACTAM, HEXAMETHYLENEDIAMMONIUM ADIPATE, HEXAMETHYLENE DIAMMONIUM SEBACATE

Noboru Fukuma; Hiroshi Chayamiti; Toshio Okamoto; Seizaburo Shigeta, and Hiroshi Takeda, all of Nobeoka-shi, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Kita-ku Osaka, Japan

Filed Jan. 30, 1968, Ser. No. 701,615
Claims priority, application Japan, Jan. 31, 1967, Jan. 31, 1967, 42/5793;42/5794
Int. Cl. D02g 3/00
U.S. Cl. 161—173 4 Claims



Composite filaments capable of giving excellent crimped yarns are obtained by using, in the production of polyamide composite filaments, the terpolyamide 6/66/610 as a copolymer to be used in combination with either nylon 6 or nylon 66. The proportions of the individual monomers in the terpolyamide are specified in the areas A and B in the accompanying drawing.

3,607,611

COMPOSITE FILAMENT HAVING CRIMPABILITY AND LATENT ADHESIVITY

Masao Matsui, Takatsuki; Susumu Tokura, Osaka, and Masahiro Yamabe, Neyagawa, all of Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Sumida-Ku, Tokyo, Japan

Filed Dec. 13, 1968, Ser. No. 783,585
Claims priority, application Japan, Oct. 9, 1968, Dec. 21, 1967, Dec. 21, 1967, 43/73752;42/82250;42/82257
Int. Cl. D02g 3/00
U.S. Cl. 161—173 22 Claims

A composite filament suitable for manufacturing ladies' stockings having a crimpability comprising at least two fiber-forming components differing in shrinkability, which has such a particular cross section that one component is interposed into the other component, for example, in a wedge-shape and occupies only 5 to 30 percent of the peripheral surface of the filament, is manufactured by flowing two independent same or different spinning materials in opposite directions to each other in two ducts each connecting to a common conduit and combining them and interposing a thin layerlike flow of another spinning material different from the above-described spinning materials between the two spinning material flows at the combined portion in the above-described particular cross-sectional shape and then extruding the thus combined spinning materials through the conduit from a common orifice.

3,607,612

SARAN RIBBON FOR DRY-CLEANABLE TEXTILES

Robert L. Hudson, Saverna Park, Md., assignor to Esso Research and Engineering Company

Filed June 24, 1969, Ser. No. 836,172
Int. Cl. C08f 45/36; D01f 7/02
U.S. Cl. 161—181 10 Claims

Flat extruded saran filaments are provided for use in textile fabrics which may be dry cleaned in perchloroethylene without providing excessive shrinkage of the saran. The saran composition from which the flat filaments are formed must contain no more than 5 percent by weight of extractable organic additives based on the total quantity of the saran copolymer and the additives. The organic additives constitute a stabilizing plasticizer which is an ester of fumaric acid, maleic acid, itaconic acid or aconitic acid, and a light stabilizer; in addition, no more than about 0.5 percent of a nonextractable, primarily inorganic phosphate stabilizer is also used. The composition contains an additional quantity of about 5 percent of branched polyethylene.

3,607,613

ELECTRICALLY CONDUCTIVE REFRACTORY BODIES

Edmund M. Passmore, Wilmington, and Donald P. Wilde, Marblehead, both of Mass., assignors to Sylvania Electric Products Inc.

Filed May 27, 1968, Ser. No. 732,073
Int. Cl. B32b 9/04
U.S. Cl. 161—182 2 Claims

A unitary electrically conductive refractory body is made by joining at least two such smaller bodies. A thin layer of refractory powder is first applied to the interface layer between the two bodies. Heat and pressure is then applied thereto to form the unitary body. The smaller bodies can be formed of an admixture of AlN, BN and TiB_2 and the refractory powder can be a transition metal boride, carbide or nitride.

3,607,614

ADHESIVES

Iain Andrew MacKay, London, England, and Nanbhai Bharucha, Montreal, Quebec, Canada, assignors to The British Non-Ferrous Metals Research Association, London, England

Filed Mar. 4, 1969, Ser. No. 804,307
Int. Cl. C08f 45/60; C09j 3/14; H01b 7/20
U.S. Cl. 161—218 5 Claims

An adhesive, for a metal, particularly for adhering lead to a polyolefin, contains an addition of 2,5-dimercaptothiadiazole in an amount suitable to act as a complexing agent for the metal so as to create a barrier to prevent acidic scission products formed in the adhesive from reacting with the metal and destroying adhesion.

3,607,615

COMPOSITE ACRYLIC FILMS FOR COATING

Hiroshi Hatakeyama, Ohtsu-shi; Takeo Fusayama, Ohtsu-shi; Motozo Fujiwara, Nagoya-shi, and Masahiro Aoyama, Nagoya-shi, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed June 2, 1969, Ser. No. 829,802
Claims priority, application Japan, May 31, 1968, 43/36912
Int. Cl. B32b 15/08, 27/08, 27/30
U.S. Cl. 161—218 16 Claims

Composite films comprising upper and lower layers of acrylate copolymers adapted to be employed as coating compositions, and coated laminates produced therefrom.

3,607,616

LAMINATED AMORPHOUS AND CRYSTALLINE POLYPROPYLENE SHEETING

Herbert S. Barbehenn, and Robert F. Williams, Jr., both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 22, 1968, Ser. No. 778,330
Int. Cl. B32b 27/12
U.S. Cl. 161—252 6 Claims

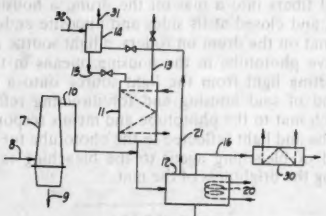
A laminated polypropylene sheeting having physical properties comparable to those of crystalline polypropylene sheeting and comprising a core of polypropylene fiber batting impregnated with amorphous polypropylene laminated to at least one and preferably between two sheets of crystalline polypropylene is disclosed.

3,607,617

TURPENTINE RECOVERY FROM THE WET GASEOUS EFFLUENT OF WOOD-PULPING PROCESSES

John Drew, Jacksonville, Fla., assignor to SCM Corporation, Cleveland, Ohio

Filed Aug. 9, 1968, Ser. No. 751,425
Int. Cl. D21c 11/06
U.S. Cl. 162—15 7 Claims



This application discloses a method and apparatus for improving the recovery of turpentine from the gaseous byproducts of wood-pulping processes through improved condensation and decantation processes. The turpentine recovery is improved by condensing the wet gaseous effluent from a wood-pulping process to produce a condensate containing turpentine and water, and then decanting the turpentine phase from the water phase at a temperature that ranges from at least about 125° F., to the boiling point of the condensate thereby reducing turpentine losses with the aqueous underflow from the decanter.

The wet gaseous effluent can be condensed and cooled at conventional condensing temperatures (i.e. 90° F.–110° F.) in which case the condensate is warmed to 125° F. or higher before decanting.

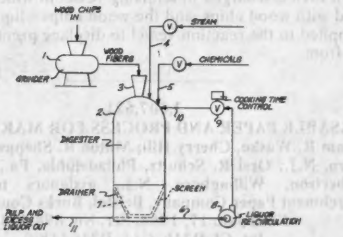
Alternatively and preferably the wet gaseous effluent is condensed and cooled to a temperature ranging from at least about 125° F. to the boiling point of the condensate and the immiscible phases are separated without additional heat exchange. In this preferred embodiment vent gases from the condenser must be further cooled to prevent the loss of turpentine as uncondensed vapor.

3,607,618

WOOD-PULPING PROCESS

Curt Uschmann, Lebanon, and Erik Berglund, Oswego, both of Oreg., assignors to Process Development Corporation, Portland, Oreg.

Filed Nov. 6, 1967, Ser. No. 680,731
Int. Cl. D21b 1/04; D21c 3/24
U.S. Cl. 162—17 2 Claims



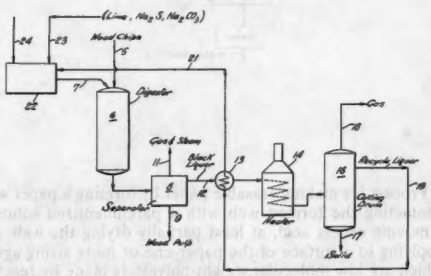
Woolly wood fibers having lengths in the range of one-sixteenth to one-quarter of an inch and cross-sectional dimensions within the range of 0.1 to 0.05 mm., obtained by grinding wood chips of the order of one inch in length in a ribbed plate grinder, are digested in a continuous type of digester by heating such fibers at a temperature in the range of 220° F. to 330° F. for a period of 1 to 20 minutes in acid bisulfite, bisulfite or neutral sulfite cooking liquor. The consistency of the mixture is controlled by regulating the amount of cooking liquor which is recirculated through the digester, and the consistency of the mixture governs the speed of its flow through the digester and consequently controls the cooking time.

3,607,619

COKING OF BLACK LIQUOR IN THE ABSENCE OF ADDED FREE OXYGEN

Howard V. Hess, Glenham, and Edward L. Cole, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 29, 1968, Ser. No. 780,079
Int. Cl. D21c 11/12
U.S. Cl. 162—30 6 Claims



Process for treatment of black liquors from kraft pulp mills wherein black liquor is heated, in the absence of added free oxygen, under pressure at a temperature in the range of 450 to 700° F. for a period of 0.5 minutes to 6 hours to form a solid granular coke product which is separated from the

resulting liquid to yield an aqueous liquid effluent suitable for reuse in the pulp making process.

3,607,620

BATCH DIGESTION WITH PREMIXED DIGESTION LIQUOR

Lawrence A. Carlsmith, Amherst, N.H., assignor to Improved Machinery Inc., Nashua, N.H.

Filed Jan. 27, 1969, Ser. No. 794,023
Int. Cl. D21c
U.S. Cl. 162—37 **9 Claims**

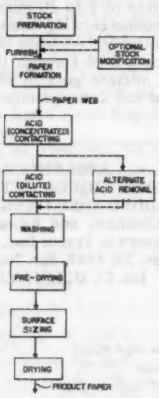
A batch digesting or pulping apparatus in which a reaction vessel is provided a premixed, reaction liquors mixture predetermined as suitable for the batch-pulping operation. The reaction vessel is connected to supply premixed liquors to a mixing vessel wherein the liquors are intermixed with wood chips; and the wood chips—liquors mixture is pumped to the reaction vessel whereby the chips are sluiced into the latter and the mixture displaces liquors from the reaction vessel. Also, a batch digesting or pulping method wherein a premixed, reaction liquors mixture is supplied to a reaction vessel, then discharged to a mixing vessel in which it is intermixed with wood chips, and the wood chips—liquors mixture is supplied to the reaction vessel to displace premixed liquors therefrom.

3,607,621

ERASABLE PAPER AND PROCESS FOR MAKING SAME

William R. Wasko, Cherry Hill; Milton R. Sheppard, Willingboro, N.J.; Orsi R. Schultz, Philadelphia, Pa., and Sol A. Albertson, Willingboro, N.J., assignors to Paterson Parchment Paper Company, Bristol, Bucks County, Pa.

Filed Jan. 17, 1968, Ser. No. 698,474
Int. Cl. D21h *3/34;* **D21f** *11/00*
U.S. Cl. 162—135 **8 Claims**



Process for making erasable paper by forming a paper web, contacting the formed web with a parchmentized solution, removing excess acid, at least partially drying the web, and applying to a surface of the paper one or more sizing agents which are low molecular weight polyesters made by reaction of rosin and maleic anhydride adducts with polyhydric alcohols, and are preferably polyesters of rosin-maleic anhydride adducts with aliphatic polyols, and are applied alone or in combination with certain additives. The invention also includes the product of the foregoing process.

3,607,622

AMINOPOLYAMIDE-ACRYLAMIDE-POLYALDEHYDE RESINS HAVING UTILITY AS WET AND DRY STRENGTH AGENTS, RETENTION AIDS AND FLOCCULANTS AND A PROCESS OF MAKING AND USING THEM AND PAPER MADE THEREFROM

Herbert H. Espy, Fairfax, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed July 24, 1968, Ser. No. 747,090
Int. Cl. D21h *3/58;* **C02b** *1/20;* **C08g** *9/02*
U.S. Cl. 162—167 **22 Claims**

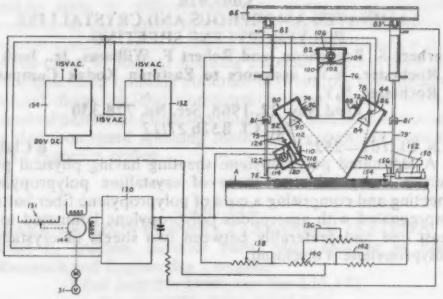
Disclosed is a novel aminopolyamide—acrylamide—polyaldehyde resin useful in the paper making art to enhance the wet and dry strength of paper. Small amounts of the resin can also be used as a retention aid for mineral fillers in paper and as a flocculant for suspended matter.

3,607,623

METER FOR MEASURING BRIGHTNESS OF BLEACHED FIBERS AND CONTROLLING THE BLEACHING PROCESS

James H. Chappelle, Kensington, Georgetown, S.C., assignor to International Paper Company, New York, N.Y.

Continuation of application Ser. No. 535,402, Mar. 18, 1966, now abandoned. This application May 1, 1970, Ser. No. 31,857
Int. Cl. D21c *7/12;* **H01j** *39/12*
U.S. Cl. 162—252 **5 Claims**



Apparatus for continuously controlling the bleaching of fibers and for continuously measuring and recording the brightness of light reflected from the bleached fibers having a bleaching tank, means for feeding fibers to the tank, means for feeding bleaching agents to the tank, means for feeding bleached fibers from the tank, a drum for forming the bleached fibers into a mat on the drum, a housing open at one end and closed at its sides and opposite ends supported on the mat on the drum on rollers, a light source and a light-responsive phototube in the housing, means in the housing for directing light from the light source onto a mat at the open end of said housing and for directing reflected light from such mat to the phototube and means responsive to the phototube and light reflected to the phototube for controlling the feed of bleaching agent to the bleaching tank and for recording the brightness of the mat.

3,607,624

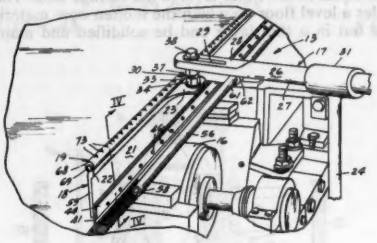
SELF-CLEANING DECKLE RAIL FOR PAPERMAKING MACHINES

Walter R. Moody, NeKoosa; Thomas S. O'Day, Wisconsin Rapids, and Stanley J. Cwicklo, Wisconsin Rapids, all of Wis., assignors to Nekoosa Edwards Paper Company Inc., Port Edwards, Wis.

Filed Aug. 22, 1969, Ser. No. 852,282
Int. Cl. D21f *1/56, 1/58*
U.S. Cl. 162—272 **11 Claims**

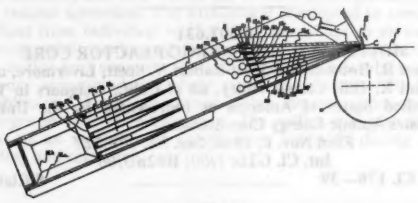
A water-distribution tube is placed superjacent the deckle rail on a papermaking machine. The tube is provided with an

aperture opening on its upper surface and directing notches which are formed on the upper surface of the tube and disposed transverse to the length of the tube. Water discharged from the aperture is directed by the notches



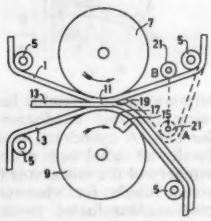
downwardly along opposite sides of the tube and on the corresponding sides of the deckle rail. In this manner the rail is continuously washed and coated with water thereby eliminating corrosion loading.

3,607,625
HEADBOX
Lester M. Hill, Beloit, Wis.; Joseph D. Parker, Roscoe, Ill., and Richard E. Hergert, Rockton, Ill., assignors to Beloit Corporation, Beloit, Wis.
Filed Jan. 17, 1968, Ser. No. 698,633
Int. Cl. D21f *1/02*
U.S. Cl. 162—343 **14 Claims**



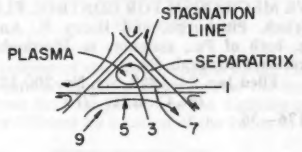
A headbox construction for a papermaking machine which comprises a slice chamber connected to a preslice flow chamber by means of a perforate member. The slice chamber contains a plurality of plates and/or filaments attached to said perforate member and extend in the direction of stock flow through said slice chamber and define therein a multiplicity of relatively narrow channels of decreasing cross-sectional area in the direction of flow.

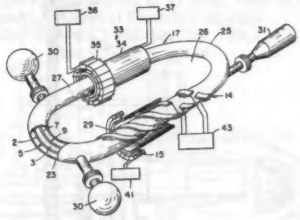
3,607,626
DOUBLE-FELTED PRESS
Jan Peter Nilsson, Karlstad, Sweden, assignor to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden
Filed Sept. 10, 1969, Ser. No. 856,654
Claims priority, application Sweden, Sept. 17, 1968, 12491/68
Int. Cl. D21f *3/00*
U.S. Cl. 162—358 **1 Claim**



A double-felted press for a papermaking machine or the like comprises a pair of press rolls arranged to form a nip and an endless press felt trained around a segment of each of the rolls, the press felts passing through the nip. One of the rolls is a suction roll, and the suction zone is located entirely on the downstream side of the roll, relative to the direction of rotation of the roll, from the nip, is contiguous or in proximate relation to the nip, and is within the segment of the roll over which the felt for that roll is trained. A guide roll for the felt associated with the other press roll (the nonsection-roll is normally positioned such that the felt is separated from the web being pressed before the web reaches the suction zone of the suction roll but is arranged to be moved to a position training that felt around the suction zone of the suction roll so that the two felts turn around the suction zone of the suction roll and ensure that the web runs with the suction-roll felt. Normally, the two felts are trained to run together over the suction zone of the suction roll only upon startup of the machine.

3,607,627
STELLARATOR CONFIGURATION UTILIZING INTERNAL SEPARATRICES
Harold P. Furth, Princeton; John L. Johnson, Princeton, and George V. Sheffield, Hopewell, all of N.J., assignors to The United States of America as represented by the United States Atomic Energy Commission
Filed Oct. 10, 1968, Ser. No. 766,432
Int. Cl. G21b *1/00*
U.S. Cl. 176—3 **9 Claims**



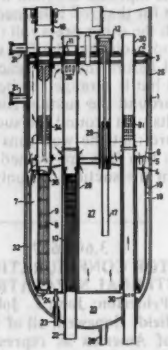


Stellarator having internal separatrices such that the equilibrium properties are favorable for stability and stellarator method for providing a stable equilibrium region for confining a plasma both inside and outside the internal separatrices, and for maximizing the three functions of large rotational transform, strong shear θ, and deep well V''.

3,607,628
REFUELLING TUBE IN A WATER-COOLED NUCLEAR REACTOR
Lars Olof Tor Wadmark, Nasby Park, Sweden, assignor to Aktienbolaget Atomenergi, Stockholm, Sweden
Continuation of application Ser. No. 598,757, Dec. 2, 1966, now abandoned. This application Oct. 8, 1968, Ser. No. 768,211
Int. Cl. G21c *19/20*
U.S. Cl. 176—31 **1 Claim**

In a water-cooled nuclear reactor, fuel is introduced into the interior of the reactor vessel through a refuelling tube

which extends through a water-filled portion of the reactor core. The cooling of the refuelling tube is made possible by the provision of openings in said tube below the reactor core



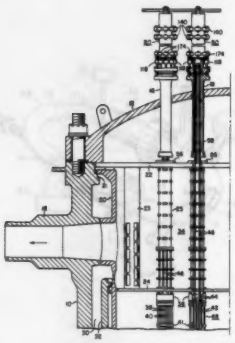
and above the reactor core whereby heat produced by a fuel cartridge when passing through said tube induces a flow of water through said tube.

3,607,629

DRIVE MECHANISM FOR CONTROL ELEMENTS

Erling Frisch, Pittsburgh, and Harry N. Andrews, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 24, 1968, Ser. No. 700,121
Int. Cl. G21c *7/16*
U.S. Cl. 176—36 **10 Claims**



A nuclear reactor is disclosed wherein hydraulic drive mechanisms are provided to vary the location of a plurality of neutron-absorbing control elements associated with selected fuel assemblies. Each fuel assembly comprises a fixed array of commingled and spaced fuel pins and guide tubes. Each selected assembly has a plurality of individually movable two-position control elements which are coupled to drive mechanisms which operate to telescope the control elements within their associated guide tubes.

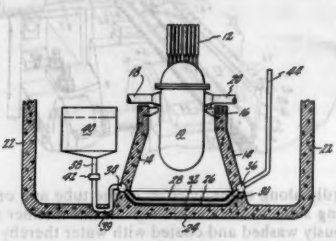
3,607,630

MOLTEN CORE STOPPING DEVICE

John M. West, and William D. Fletcher, III, both of Hartford, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 22, 1969, Ser. No. 852,175
Int. Cl. G21c *9/00*
U.S. Cl. 176—38 **12 Claims**

A water-cooled metal basin is located under a nuclear reactor vessel to catch, cool, solidify and retain molten core material dropped from the vessel upon a burn-through of the vessel. A plurality of horizontally disposed water-filled tubes in the basin have a common inlet connected with an elevated storage tank and have discharge outlets positioned at a height at least equal to the water level in the storage tank. The basin provides a level floor on which the molten core material may spread out in a thin layer and be solidified and maintained



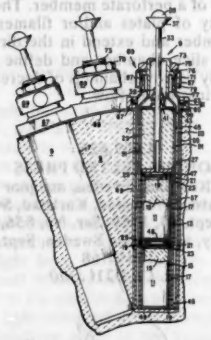
solid by transfer of heat to water passing through the tubes. The tubes may also extend vertically above the basin to absorb heat radiated from the upper surface of the layer and radiating fins may be provided in the basin. A second material may also be provided to absorb heat from the molten reactor material by melting of the second material thereby solidifying the molten core material. Waterflow is started automatically by convention and gravity.

3,607,631

MODERATED THERMIONIC REACTOR CORE

Robert R. Hobson, San Jose; Robert N. Scott, Livermore, and Paul R. Hill, Castro Valley, all of Calif., assignors to The United States of America as represented by the United States Atomic Energy Commission.

Filed Nov. 6, 1968, Ser. No. 774,227
Int. Cl. G21c *1/00*; **H02n** *3/00*
U.S. Cl. 176—39 **8 Claims**



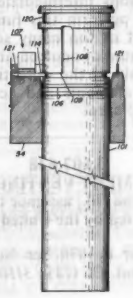
A moderated thermionic core assembly has been provided which employs vapor chamber condenser-cooled stacked thermionic fuel elements. A cylindrical moderator block is provided with a plurality of radial wells drilled in an ordered array about the periphery of the moderator block. Each well is adapted to receive a tubular fuel element which includes two series-connected nuclear fueled thermionic converter elements having a neutral plasma maintained between the emitter and collector electrodes of each converter. Each fuel element includes a vapor chamber condenser which extracts excess heat from the collectors and transmits it to an external reflector from which the excess heat is radiated to space.

3,607,632

NUCLEAR REACTOR ORIFICE-SEAL ARRANGEMENT

Ned P. Hansen, and Ralph W. Guenther, both of San Jose, Calif., assignors to General Electric Company

Filed Nov. 26, 1968, Ser. No. 779,135
Int. Cl. G21c *15/22*
U.S. Cl. 176—43 5 Claims



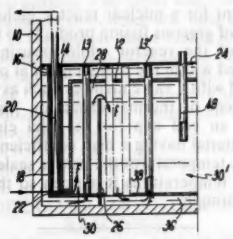
An orifice-seal arrangement, acting primarily as a coolant conduit, for nuclear reactors is disclosed. An orifice-seal consists of two coaxial telescoped tubes which are secured to a fuel assembly and to a wall of the coolant outlet plenum during reactor operation. The orifice-seal is adapted to conduct coolant from individual nuclear fuel assemblies to an outlet plenum, while sealing against coolant leakage. In addition, the orifice-seal supports the individual fuel assemblies in a manner accommodating slight radial movement of fuel assemblies and thermal expansion within the assemblies during changes in reactor temperature. The orifice-seal also functions as an indicator of proper core assembly during fuel loading and reloading.

3,607,633

BOILING HEAVY WATER INDIRECT-CYCLE REACTOR

Maurice Fajeau, Verrieres Le Buisson, France, assignor to Commissariat a L'Energie Atomique, Paris, France

Filed Mar. 21, 1968, Ser. No. 714,866
Claims priority, application France, Apr. 5, 1967, PV104138
Int. Cl. G21c *15/00*
U.S. Cl. 176—54 5 Claims



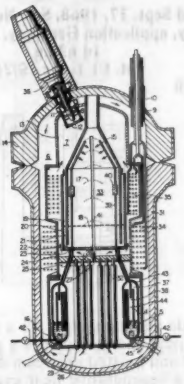
The boiling heavy water reactor has heat exchangers located in the pressure vessel around a tank containing part of the heavy water inventory which constitutes the moderator. The flow of heavy water used as coolant circulates along two different paths. The first path comprises the heat exchangers, the interior of the tank and certain of the guide tubes locating the fuel elements. The second path comprises the other guide tubes. Both paths open into a collector space above the tank.

3,607,634

PRESSURIZED NUCLEAR REACTOR WITH SIMPLIFIED ARRANGEMENT FOR DISTILLATION OF PRIMARY FLUID

Claude J. O. L. Gerard, Erpent; Fernand A. J. L. Lamproye, Haccourt, and Henri C. G. Piron, Liege, all of Belgium, assignors to Societe Anglo-Belge Vulcain, Brussels, Belgium

Continuation-in-part of application Ser. No. 482,830, Aug. 26, 1965, now abandoned. This application Dec. 10, 1968, Ser. No. 782,623
Int. Cl. G21c *19/30*
U.S. Cl. 176—54 10 Claims



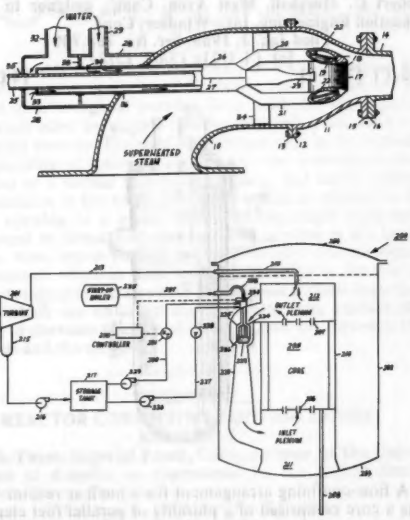
A nuclear reactor of the type having a boiler therein for distillation of primary fluid, in which reactor the internal arrangements have been simplified and the distilling operation rendered more efficient by location of the boiler in the thermal shield.

3,607,635

NUCLEAR REACTOR WITH VARIABLE FLOW STEAM CIRCULATOR

Charles C. Ripley, and Gerald L. O'Neill, both of San Jose, Calif., assignors to General Electric Company

Filed Apr. 10, 1968, Ser. No. 720,320
Int. Cl. G21c *15/24*
U.S. Cl. 176—56 2 Claims



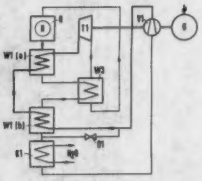
A steam cooled nuclear reactor power plant having an improved thermopresser capable of part load operation. In a

steam thermopresser in which water droplets are injected into flowing superheated steam, a system is provided by which waterflow can be decreased as steam flow decreases, while maintaining an optimum thermopresser throat configuration at any flow rate.

3,607,636
NUCLEAR POWER STATION WITH CO COOLING SYSTEM

Jorg Nageler, and Hans-Peter Schabert, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

Filed Sept. 27, 1968, Ser. No. 763,264
Claims priority, application Germany, Sept. 29, 1967, P 16 14 620.6
Int. Cl. G21c *19/28*
U.S. Cl. 176—60 **8 Claims**

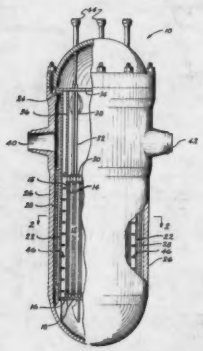


Carbon dioxide cooling system for a nuclear power station producing electrical energy includes a gas turbine connected to a compressor and located upstream of the coolant gas inlet to the reactor, a regenerative heat exchanger connected in the coolant gas line between the compressor and the gas turbine, the primary loop of the regenerative heat exchanger being traversed by heated coolant issuing from the reactor either directly or after being relatively slightly reduced in pressure, the coolant further traversing a cooler connected in the primary loop, the coolant entering the compressor having a pressure within a range of at least 40 atma. and 130 atma., and further including means for supplying supplementary heat from the gas leaving the turbine to the high-pressure gas heated in the regenerative heat exchanger so as to increase the turbine inlet temperature and the entire efficiency therewith.

3,607,637
NUCLEAR REACTOR COOLANT FLOW DEVICE

Robert C. Marshall, West Avon, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jan. 3, 1969, Ser. No. 788,709
Int. Cl. G21c *15/02, 15/24*
U.S. Cl. 176—61 **14 Claims**

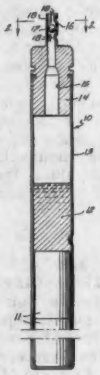


A flow-confining arrangement for a nuclear reactor which has a core comprised of a plurality of parallel fuel elements. The core is of the open type wherein the flow surrounds each of the fuel rods. A core barrel surrounds the core and generally confines the coolant flow which is passing longitudinally of the fuel elements. A plurality of seal plates extend transversely from the core barrel to the outer fuel elements of the core. These plates prevent flow through the irregular annular space between the core barrel and the core so as to avoid coolant bypassing the core. A plurality of these plates are at locations intermediate the top and bottom of the core with the spacing between these seal plates being sufficiently smaller so that the coolant flow does not expand in this flow path to flow through all the irregular annular opening. This close spacing assures that the coolant flow is effectively confined to the reactor core not only at the seal plate location but also at the locations intermediate the seal plate. The maximum spacing to perform this function is preferred to avoid the requirement of too many seal plates. These seal plates provide a minimum of neutron-absorbing material near the outer fuel elements of the core thereby increasing the output of these fuel elements and accordingly the overall power capability of the core.

3,607,638
FUEL ELEMENT VENTING SYSTEM

Orville S. Seim, Wheaton, Ill., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed Apr. 8, 1970, Ser. No. 26,575
Int. Cl. G21c *3/10*
U.S. Cl. 176—68 **5 Claims**



A fuel element for a nuclear reactor includes a vent permitting release of gaseous fission products to the coolant during operation of the reactor while ensuring that the fuel material is sealed within the fuel element at other times. This is accomplished with a valve member such as a ball or needle of low coefficient of thermal expansion disposed within a passageway in an end cap for the fuel element which is formed of a material having a high coefficient of thermal expansion. At low temperatures the vent is sealed by the ball or needle, at high temperatures it is open so that fission gases can pass therethrough.

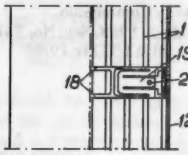
3,607,639
FUEL ASSEMBLY FOR NUCLEAR REACTORS

Aart Van Santen, Hokasen; Lars-Erik Samskog, Vasteras, and Lars Tornblom, Vasteras, all of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed July 11, 1968, Ser. No. 744,127
Claims priority, application Sweden, July 17, 1967, 10593/67
Int. Cl. G21c *3/32*
U.S. Cl. 176—78 **7 Claims**

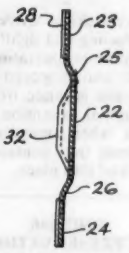
A fuel assembly for nuclear reactors is formed of a plurality of substantially parallel fuel rods arranged between a top plate and a bottom member inside a sheathing tube. Spacer

elements for these tubes are provided with leaf springs secured to the spacer frames, the free ends of the springs



having buttons thereon engaging in holes in the sheathing tube to position the spacer elements in the tube.

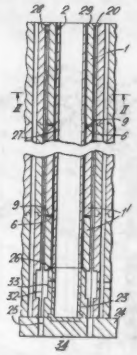
3,607,640
PERIMETER STRIP FOR A NUCLEAR REACTOR FUEL ASSEMBLY SUPPORT GRID
Donald M. Krawiec, Thompsonville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.
Filed June 24, 1968, Ser. No. 739,221
Int. Cl. G21c *3/34*
U.S. Cl. 176—78 **9 Claims**



A perimeter strip for a nuclear reactor fuel assembly support grid. The perimeter strip forms the outer edge of an egg-crate-type fuel-rod-spacing grid and is rigidly welded to the strips passing intermediate the fuel rods. It comprises a central portion parallel to the fuel rods and spaced therefrom as well as upper and lower portions parallel to the fuel rods at a location inwardly of the central portion. Sloping portions of the strip join the central portion and the upper and lower portions, with the distance between the outer surface of the outer fuel rods and the outer surface of the upper and lower portions being less than the distance between the outer surface of the central portion. The upper and lower portions are arched inwardly slightly to contact alternate fuel rods, while the and portion is formed to make resilient spring contact with the intermediate fuel rods. The sloped portion has holes therethrough adjacent the arches where rigid contact is made with the fuel rods. The egg crate structure is welded to the perimeter strip intermediate the arches and springs only at the upper and lower portions.

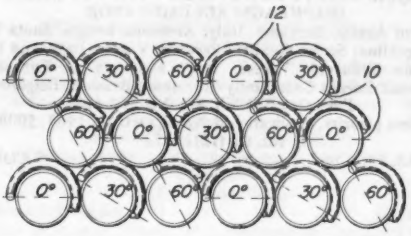
3,607,641
GRAPHITE MODERATOR STRUCTURES FOR NUCLEAR REACTORS
Robert Lind, and Norman Price, both of Warrington, England, assignors to United Kingdom Atomic Energy Authority, London, England
Filed Feb. 2, 1968, Ser. No. 702,735
Claims priority, application Great Britain, Feb. 28, 1967, 9482/67
Int. Cl. G21c *19/28*
U.S. Cl. 176—59 **3 Claims**

A graphite-moderated nuclear reactor with a reentrant core is provided with means for inducing coolant flowing through the moderator to diffuse into the moderator. The means may comprise flow restrictors in the coolant flow path whereby a pressure drop is created across individual graphite bricks forming the moderator, and gas seals between the bricks. To facilitate sealing, engagement between bricks stacked in columns is in the peripheral region by recesses and



separate keys pegged in position, leaving internal annular plane continuous surfaces in and between which a sealing ring is provided.

3,607,642
NUCLEAR REACTOR FUEL ASSEMBLY
Thomas B. Murdock, and Jack N. Fox, both of San Jose, Calif., assignors to General Electric Company
Filed Nov. 26, 1968, Ser. No. 778,999
Int. Cl. G21c *3/30*
U.S. Cl. 176—78 **18 Claims**

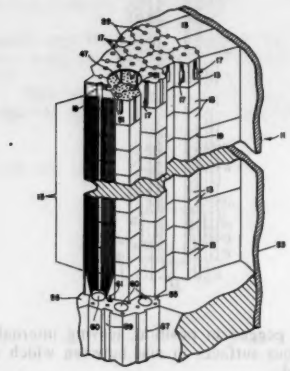


An assembly comprising a plurality of rods containing fissionable material is disclosed. Typically, the fuel rods are arranged in a hexagonal parallel array, with the rods spaced from each other by wires wound around and down each rod in a spiral manner. The rods are fastened only at the bottom, to a plurality of spaced support bars. The assembly is surrounded by a shroud terminating in inlet and outlet orifices or transitions at the ends. The lower orifice is adapted to fit in an opening in a plate, while allowing slight transverse movement of the shroud and fuel rods relative to the lower orifice. Also, improved flow and heat transfer characteristics are obtained where at least some of the wires in the row of fuel rods adjacent the assembly shrouds are formed from thin tubes, which are flattened slightly where they contact the shroud to decrease the size of the fluid flow gap between the fuel rods and the shroud.

3,607,643
REACTOR CORE WITH REMOVABLE CORE ELEMENTS
John A. Paget, Imperial Beach, Calif., assignor to The United States of America as represented by the United States Atomic Energy Commission
Filed Apr. 4, 1969, Ser. No. 813,450
Int. Cl. G21c *5/00*
U.S. Cl. 176—84 **3 Claims**

In the top layer of a lattice of core elements, keys interlock the core elements and provide geometric stability for a reac-

tor core. Mores specifically, the core elements are interlocked by loose, shared keys extending between keyways in a pair of adjacent core elements. These loose shared keys are readily slideable from the keyways with removal of either of



the core elements whereby the cavity is left clear to receive new replacement core elements. Fixed keys may also be attached to the core elements to facilitate alignment and keying of core elements to each other.

3,607,644

LIQUID-SAFETY-ROD SYSTEM WITH A FLEXIBLE DIAPHRAGM ACCUMULATOR

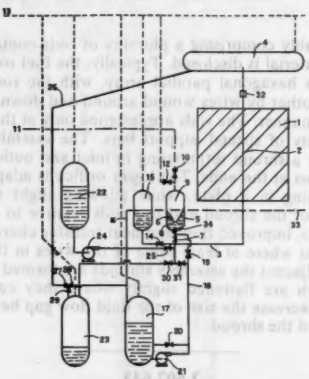
Alberto Agazzi, Bergamo, Italy; Armando Broggi, Santa Fe, Argentina; Sergio Galli De Paratesi, Varese, Italy, and Luciano Ghiurghi, Varese, Italy, assignors to European Atomic Energy Community (Euratom), Brussels, Belgium

Filed Oct. 2, 1968, Ser. No. 764,413

Claims priority, application Belgium, Oct. 26, 1967, 50095

Int. Cl. G21c *7/22*

U.S. Cl. 176—86 **9 Claims**



A liquid-safety-rod system for nuclear reactors comprising a lower poison-solution reservoir, a poison-solution accumulator containing a flexible diaphragm connected therewith, a source of high-pressure gas to force the poison solution out of the accumulator into a connecting collector and thence into tubes extending through the reactor core and a washing circuit comprising a washing-liquid reservoir, a washing-residue reservoir and a pump connected to said tubes.

3,607,645

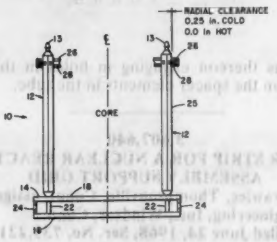
REACTOR CORE RADIAL LOCKING DEVICE

Raymond S. Stankiewicz, Ellington, Conn., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed July 2, 1968, Ser. No. 741,960

Int. Cl. G21c *19/06*

U.S. Cl. 176—87 **3 Claims**



A nuclear reactor core-locking device which holds the fuel assembly loosely for refueling and tightly against vibration or other adverse movement under operating conditions. A core-retainer band surrounds and is spaced from the core at assembly. The retainer band is made from material having a lower coefficient of thermal expansion than the core structural material so that when operating temperatures are reached the core expands into contact with the band and becomes effectively locked into place.

3,607,646

METHOD FOR THE PRESERVATION OF ANIMAL OR HUMAN ORGANS IN LIVING CONDITION

Henry de Roissart, Grenoble, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Apr. 2, 1969, Ser. No. 812,696

Claims priority, application France, Apr. 4, 1968, 147,053

Int. Cl. A61r *17/00*

U.S. Cl. 195—1.7 **12 Claims**

A method and apparatus is described, pertaining to the preservation of living tissue such as an organ excised from the body for an extended time in view of future transplant thereof. The organ is placed in a refrigerated environment and under pressure while a nutrient fluid is circulated through its arterial complex. The gas utilized for pressurizing the environment of the organ is biochemically inert and serves as a carrier of oxygen which is absorbed by the nutrient, the latter being subjected to the influence of the pressurizing gas.

3,607,647

TREATMENT OF SUGAR SOLUTIONS

Peter Hidi, Kingsgrove, New South Wales; Ian G. R. Burgess, Warrawee, New South Wales, and Robin H. Holdgate, Wahroonga, New South Wales, all of Australia, assignors to The Colonial Sugar Refining Company Limited, Sydney, New South Wales, Australia

Filed Apr. 19, 1967, Ser. No. 631,888

Int. Cl. C13d *3/00*

U.S. Cl. 195—11 **7 Claims**

Process for reducing the starch level of a starch-containing sucrose solution derived from sugar-bearing plant material, for example, a mill-clarified liquor or a refinery syrup, in which a thermostable bacterial amylase, such as one having α-amylase activity and being derived from the species Bacillus subtilis, is added to the solution at a temperature between 160° F. and the deactivation temperature of the amylase, the pH of the solution being neutral to slightly alkaline.

3,607,648

METHOD FOR THE PRODUCTION OF D-RIBOSE

Masahiko Yoneda, Kobe, and Ken-Ichi Sasjima, Ikeda, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 29, 1969, Ser. No. 795,045
Claims priority, application Japan, Feb. 1, 1968, 43/6224
Int. Cl. C12d *13/02*
U.S. Cl. 195—28 10 Claims

D-ribose is produced by culturing a D-ribose-producing micro-organism of the genus *Bacillus*, said micro-organism requiring L-tyrosine, L-tryptophan and L-phenylalanine in a proper culture medium. The accumulated D-ribose is subsequently recovered from the medium.

3,607,649

METHOD FOR THE PRODUCTION OF GUANOSINE AND 5'-GUANYLIC ACID

Masahiko Yoneda, Suita; Makoto Kida, Fuse; Teluji Hemmi, Amagasaki; Ikuo Nogami, Kyoto; Akira Imada, Nishinomiya; Yuichi Takeuchi, Akashi, and Einosuke Ohmura, Nishinomiya, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of application Ser. No. 525,289, Feb. 7, 1966, now abandoned. This application June 11, 1969, Ser. No. 834,933
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 12 Claims

5'-guanylic acid, guanosine or a mixture thereof produced by culturing a mutant of Bacillus pumilus Gottheil, Bacillus megaterium de Bary or Brevibacterium ammoniagenes Breed which requires both (1) adenine and (2) an amino acid and/or a water-soluble vitamin.

3,607,650

PROCESS FOR THE ENZYMATIC EXTRACTION AND PURIFICATION OF A GLYCOPEPTIDE OBTAINED FROM ANIMAL ORGANS, USEFUL AS A DRUG

Gianfranco Bertellini, Maslianico; Adriano Butti, Tavernola, and Giuseppe Prino, Milan, all of Italy, assignors to Prephar Prospection De Recherches Pharmaceutiques S.A., Schaffhausen, Switzerland

Continuation-in-part of application Ser. No. 583,070, Sept. 29, 1966, now abandoned. This application May 15, 1970, Ser. No. 37,886
Int. Cl. C07g *7/026;* C12d *5/06*
U.S. Cl. 195—29 10 Claims

Glycopeptides are extracted from the gastric mucosa or duodenum of swine by hydrolysis of the animal organ under specified conditions, followed by separation of acidic hydrolysis byproducts and dilution of the extraction product with a nonsolvent to precipitate the glycopeptides.

3,607,651

METHOD FOR THE BIOCHEMICAL ISOLATION OF L-MENTHOL

Tatsuo Moroe, Tokyo; Satohika Hattori, Yokohama-shi; Akira Komatsu, Tokyo, and Yuzo Yamaguchi, Yokohama-shi, all of Japan, assignors to Takasago Perfumery Co., Ltd, Tokyo, Japan

Filed Dec. 11, 1968, Ser. No. 783,126
Int. Cl. C12d *13/02*
U.S. Cl. 195—30 7 Claims

Method for the biochemical isolation of *l*-menthol. Specifically, an improved method for the optical resolution of racemic menthol utilizing an enzyme, carboxylic ester hydrolase, produced by the action of a micro-organism belonging to the class of Penicillium, Gliocladium, Trichoderma, Geotrichum, Aspergillus, Pullaria, Fusarium, Absidia, Cunninghamella, Rhizopus, Actinomucor, Chlamyclomucor, Mucor, Gibberella, Streptomyces or Bacillus.

The *l*-menthol may be utilized in perfumes, medicines, etc.

3,607,652

PROCESS FOR THE PRODUCTION OF D-ARABITOL

Kiyomoto Ueda, Tokyo, Japan, assignor to Eisai Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1969, Ser. No. 827,932
Claims priority, application Japan, May 25, 1968, 43/35311
Int. Cl. C12d *13/00*
U.S. Cl. 195—37 2 Claims

A process for the fermentative production of D-arabitol by cultivating under aerobical condition a micro-organism Pichia ohmeri No. 230 (ATCC Deposit No. 20209) in a nutrient medium containing fermentable saccharides such as glucose, sucrose, mannose, fructose and the like as carbon source, and recovering D-arabitol accumulated in the cultivated liquor.

D-arabitol is thus obtained at a high yield without substantial formation of other polyhydric alcohols having similar properties.

3,607,653

BACTERIAL PROTEASE COMPOSITIONS AND PROCESS FOR PREPARING THEM

Jack Ziffer, Milwaukee, and Simon Rothenberg, Shorewood, both of Wis., assignors to Pabst Brewing Company, Milwaukee, Wis.

Filed July 16, 1968, Ser. No. 745,092
Int. Cl. C07g *7/02*
U.S. Cl. 195—63 R 10 Claims

Polyethylene glycol polymers are incorporated with bacterial protease in order to improve granular characteristics and also to stabilize the protease and decrease the typical protease odor.

3,607,654

PROCESS FOR PRODUCING PURIFIED L-ASPARAGINASE

Kazuo Mochizuki, Sunto-gun; Masahiro Kohagura, Sunto-gun; Tsuneo Kagawa, Sunto-gun, and Masao Tanaka, Machida-shi, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed May 27, 1969, Ser. No. 828,386
Claims priority, application Japan, June 15, 1968, 43/40854
Int. Cl. C12d *13/10*
U.S. Cl. 195—66 A 14 Claims

The antitumor activity of L-asparaginase produced from the cultured cells of micro-organisms belonging to the genus Serratia is retained by a purification process wherein the substrate, L-asparagine, is added to the enzyme-containing solution recovered from the cells and the pH of the solution is adjusted to 4.0 or less, preferably 3.0–3.5. In this way, the L-asparaginase-inactivating factors are eliminated without impairing the activity of the L-asparaginase. This treatment can be used on a crude enzymatic solution, with subsequent purification steps, or it can be employed with an already purified L-asparaginase solution.

3,607,655

PROCESS FOR PRODUCING MILK CLOTTING ENZYME

Noboru Mukai, and Masanobu Kawai, both of Machida-shi, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Mar. 8, 1968, Ser. No. 711,530
Claims priority, application Japan, Mar. 14, 1967, Dec. 1, 1967, 15578;76751
Int. Cl. C12d *13/10;* A23c *19/02*
U.S. Cl. 195—66 11 Claims

A process for producing a milk clotting enzyme by fermentation which comprises culturing a micro-organism belonging to the genus Irpex, Fomitopsis, Coriolus or Lenzites in a nutrient medium under aerobic conditions. The enzyme accumulates in the culture liquor and may be recovered therefrom and treated so as to give a solid enzyme product useful, for example, in manufacturing cheese.

3,607,656

PRODUCTION OF A GRISEOFULVIN COMPOSITION

Bernard Maurice Laine, and Claude Raymond Magnoux, both of Lavera, Bouches, France, assignors to The British Petroleum Company, Limited, London, England

Filed Nov. 13, 1967, Ser. No. 682,610
Claims priority, application Great Britain, Nov. 25, 1966, 52,796
Int. Cl. C12d 9/00
U.S. Cl. 195—81 2 Claims

Culturing an antibiotic-producing strain of a micro-organism under aerobic conditions in the presence of an aqueous nutrient medium and in the presence of a substrate and extracting the aqueous nutrient medium, or an aqueous medium derived therefrom containing an antibiotic, with a hydrocarbon containing material and recovering a solution of an antibiotic in said material,

The invention also includes: a. culturing an antibiotic-producing strain of a micro-organism, suitably a griseofulvin-producing strain, under aerobic conditions in the presence of an aqueous nutrient medium and in the presence of a hydrocarbon substrate and thereafter, with or without the addition of a hydrocarbon medium to the culture product, separating a hydrocarbon fraction containing an antibiotic. b. culturing a first micro-organism in the presence of an aqueous nutrient medium and thereafter passing the spent medium to a second stage in which an antibiotic-producing strain of a micro-organism, is cultivated in the presence of s substrate, said substrate comprising, wholly or in part, hydrocarbons or comprising, wholly or in part, carbon compounds which are nonhydrocarbons, and thereafter, with or without addition of a hydrocarbon medium to the culture product, separating a hydrocarbon fraction containing an antibiotic, said second stage hydrocarbon comprising, wholly or in part, unmetabolished hydrocarbon from the first stage or comprising, wholly or in part, an added hydrocarbon.

Suitably the antibiotic-producing strain employed in the process of the invention is a strain producing an antibiotic having a solubility in the hydrocarbon which is used as a solvent therefore which is greater than 1 milligram-liter, suitably in the range 0.001–5 grams/liter and preferably greater than 0.5 grams/liter.

Suitably the strain which is used is a griseofulvin-producing strain.

3,607,657

PROCESS FOR THE PRODUCTION OF KASUGAMYCIN

Hamao Umezawa, 23, 4 chome, Toyotama kita, Nerima-ku; Yoshiro Okami, 18-3, 6 chome, Denenchofer, Ohta-ku; Tomio Takeuchi, 273, Imaizumi-cho, Ohta-ku, and Masa Hamada, 3-4, 7 banchi, 1 chome, Fuji-machi, Hoya, all of Tokyo, Japan

Filed Mar. 20, 1968, Ser. No. 714,432
Claims priority, application Japan, Apr. 7, 1967, 21865/67
Int. Cl. C12d 9/00
U.S. Cl. 195—80 2 Claims

Kasugamycin is produced by fermentation of a new species of streptomyces which has been named Streptomyces kasugaspinus.

3,607,658

-METHYLCROTONIC ACID AND DERIVATIVES IN CARBOMYCIN A FERMENTATION

Joseph L. Sardinas, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Mar. 6, 1969, Ser. No. 805,019
Int. Cl. C12d 9/00
U.S. Cl. 195—114 6 Claims

Addition of β-methylcrotonic acid, or derivatives thereof, to carbomycin A-producing fermentation media gives rise to an increased yield of the antibiotic.

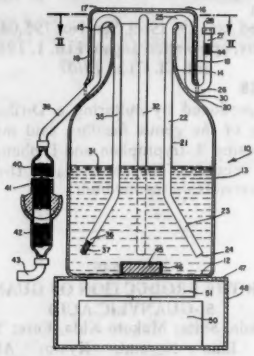
3,607,659

FERMENTATION APPARATUS

James L. Bloomer, Philadelphia, Pa., assignor to Temple University of the Commonwealth System of Higher Education, Philadelphia, Pa.

Filed Dec. 24, 1968, Ser. No. 786,570
Int. Cl. C12b 1/00
U.S. Cl. 195—142 12 Claims

Apparatus is provided in the form of fermentation vessels which are provided with caps for substantially sealing the same against contamination, and with tube means for communicating between the inside and outside of the vessels.



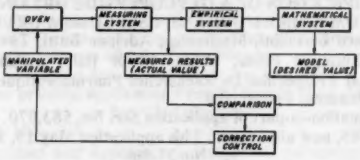
Stirring is effected by a magnetic element disposed within the vessels which is actuated by an external electromagnetic source.

3,607,660

PROCESS FOR REGULATING THE TEMPERATURE OF A COKE OVEN CHAMBER

Ernst Kumper, Essen, Germany, assignor to Heinrich Kappers Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed June 20, 1969, Ser. No. 834,995
Claims priority, application Germany, June 26, 1968, P 17 71 688.0
Int. Cl. C10b 21/10
U.S. Cl. 201—1 5 Claims



The vertical temperature profile of the coke oven chamber is continually measured during the coking process. The measured temperature profile is compared with an optimum temperature profile for that period of the coking process and deviations of the actual temperature profile from the optimum temperature profile are corrected by regulating the heat supplied to the coke oven heating walls.

3,607,661

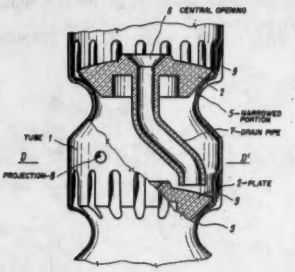
LABORATORY DISTILLATION COLUMN WITH FREELY MOVEABLE BUBBLE PLATES

Alexandr Cerny, Kyje U Prahy, and Otto Grubner, Praha, both of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Praha, Czechoslovakia

Filed Sept. 4, 1968, Ser. No. 757,406
Claims priority, application Czechoslovakia, Sept. 5, 1967, P.V. 6327-67
Int. Cl. B01d 3/20
U.S. Cl. 202—158 3 Claims

A method of manufacturing a distilling bubble plate column to be used in various laboratory techniques. The column is made from a plain glass tube which is successively and locally preheated, whereupon it is shaped by means of a shaping mandrel inserted step by step thereinto to build alternating bottlenecks and broad sections thereon, said bottlenecks serving as saddles for centrally perforated column trays providing each with a drain pipe for off downward flow

of the liquid through the column while vapors pass the column in the counterflow direction through portions



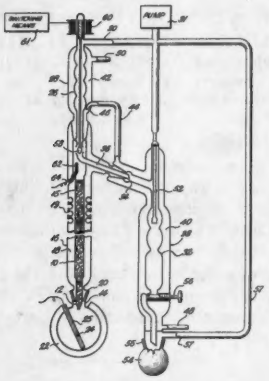
between the inner column wall and the edge of said loosely located trays which are out of contact with each other.

3,607,662

FRACTIONAL DISTILLATION APPARATUS HAVING VAPOR FLOW CONTROL MEANS FOR ALTERNATE CONDENSERS

John A. Glover, Wicker Estates, Munster, Ind., assignor to Sinclair Oil Corporation

Filed Aug. 8, 1968, Ser. No. 751,296
Int. Cl. B01d *3/42*; **F28b** *11/00*
U.S. Cl. 202—160 **10 Claims**



A laboratory distillation apparatus suitable for operation over wide temperature and pressure ranges to permit distillation of materials regardless of their state at room temperature. A vapor from the charge passes through a distillation column containing a packing material and then enters an overhead fractionating condenser. The condensate drops onto the packing, and contact rectification causes more complete separation of the vapor components. When an equilibrium condition is reached, the input to the fractionating condenser is closed and an input is opened to an overhead receiving condenser. The vapor then condenses and passes to a receiver. A temperature-control fluid surrounds the two condensers to insure that the material in them remains in the liquid state. Connections are provided for a vacuum pump to permit operation under reduced pressure.

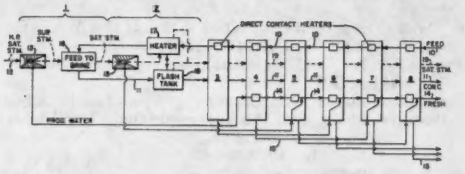
3,607,663

FLUID PURIFICATION SYSTEM

Leonard B. Vandenberg, Scotia, N.Y., assignor to General Electric Company

Filed Oct. 27, 1969, Ser. No. 869,723
Int. Cl. B01d *3/02, 3/00*
U.S. Cl. 202—173 **9 Claims**

A desalination system using a cascade of modified venturi tubes to extract fresh water from saturated steam in the nozzle throat with pressure recovery in a diffuser section. Heat transfer for regenerative feedwater heating as feedwater flows up the cascade is achieved by direct contact between



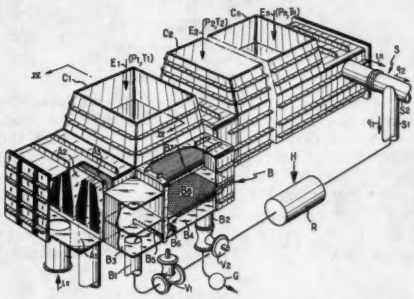
fluids. Hydraulic regeneration to reduce pumping energy is obtained by feedwater flowing down the cascade providing energy to move brine and fresh liquid product up the cascade.

3,607,664

SINGLE-STAGE FLASH DISTILLATION APPARATUS IN A STEAM CONDENSATION PLANT

Jean Mascarello, Versailles, and Roger Personnic, Chaville, both of France, assignors to Electricite de France (Service National), Paris, France

Filed Dec. 13, 1968, Ser. No. 783,539
Claims priority, application France, Dec. 15, 1967, 132,537
Int. Cl. B01d *3/00*
U.S. Cl. 202—180 **1 Claim**



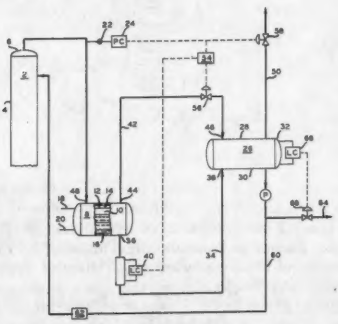
A steam condensation plant comprising a plurality of condensers incorporates a flash distillation apparatus which includes an instantaneous vaporization and condensation chamber associated with at least one of the condensers. Impure feed water for the apparatus comprises cooling water from the plant and is derived from downstream of said one of the condensers.

3,607,665

FRACTIONATOR PRESSURE CONTROL SYSTEM

Ronald S. Rogers, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed May 12, 1969, Ser. No. 823,693
Int. Cl. B01d *3/42*
U.S. Cl. 203—1 **8 Claims**



A method and apparatus for controlling the pressure within a fractionation column by regulating the rate of con-

densing, the liquid level height within the condenser and gas flow.

3,607,666

METHOD AND APPARATUS FOR SALINE WATER EVAPORATION

Paul S. Roller, 703 Colorado Bldg., 1341 G St. N.W., Washington, D.C.

Continuation-in-part of application Ser. No. 657,142, July 31, 1967, now abandoned. This application Oct. 17, 1969, Ser. No. 868,293

Int. Cl. B01d *3/34, 3/00*

U.S. Cl. 203—7 **12 Claims**

In order to prevent the formation of alkaline scale, chiefly calcium carbonate, in heating saline water before evaporation, carbon dioxide is combined with the deaerated, and, as required, chemically deoxygenated saline water, and retained during the heating. Carbon dioxide evolved after heating comprises that which had been added and that concurrently formed by bicarbonate decomposition. A portion of the evolved carbon dioxide is recirculated for combination with the saline water, while the excess is discharged or stored.

3,607,667

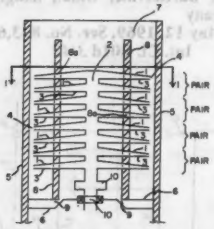
DESALINATION OF WATER BY HEAT EXCHANGE, MICROWAVE HEATING AND FLASH DISTILLATION

Edward M. Knapp, 951 North Livingston St., Arlington County, Va., and Stephen J. Nesbitt, 1111 Massachusetts Ave., Washington, D.C.

Filed Dec. 30, 1966, Ser. No. 606,261

Int. Cl. B01d *3/06*

U.S. Cl. 203—11 **3 Claims**



A process and the apparatus for the desalination of water by flash distillation. The Distillation operation is performed in five steps initiating with (1) counter current heat exchange of the water with hot fresh desalinated water; (2) generating heat throughout the body of water by the application of microwave energy; (3) passing the water in counter current heat exchange with super heated stem; (4) reducing the pressure on the water thereby causing flash vaporization and (5) separating the solute by centrifugal action. The apparatus comprises a central pipe having flat ducts in sets of four.

3,607,668

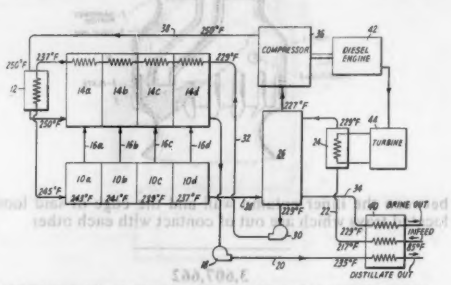
CONCENTRATED BRINE-INCOMING FEED VAPOR COMPRESSION DESALINATION SYSTEM

William Rodger Williamson, Waterford, Conn., assignor to AMF Incorporated

Filed Nov. 12, 1968, Ser. No. 774,801

Int. Cl. B01d *3/06*

U.S. Cl. 203—11 **10 Claims**



A multistage flash distillation system wherein heated feed water is passed through successively lower stages to flash into vapor, which vapor is condensed as distillate, the effluent brine from the lowest stage being passed to a boiler to produce steam, which steam is compressed and so utilized to heat the incoming feed.

3,607,669

SEPARATION OF PROPYLENE OXIDE FROM WATER BY DISTILLATION WITH AC-8 TO 12 HYDROCARBON

John C. Jubin, Jr., Wallingford, Pa., assignor to Atlantic Richfield Company, New York, N.Y.

Filed Apr. 4, 1969, Ser. No. 813,727

Int. Cl. B01d *3/34*

U.S. Cl. 203—14 **13 Claims**

This invention relates to a method of separating propylene oxide from water which comprises distilling the mixture in the presence of an open chain or cyclic paraffin containing from 8 to 12 carbon atoms. The paraffin alters the volatility of the water relative to that of propylene oxide and permits the removal of water as overhead while the propylene oxide is taken off as bottoms. The amount of paraffin utilized normally ranges from about 5 to about 40 parts by weight per 1 part by weight propylene oxide.

3,607,670

METHOD AND APPARATUS FOR DEODORIZING GLYCERIDE OILS WITHIN A SINGLE VESSEL USING COUNTER CURRENT INDIRECT HEAT EXCHANGE AND DIRECT SUPERHEATED STEAM INJECTION

Robert R. King, Sherman, Tex., assignor to The French Oil Mill Machinery Company, Piqua, Ohio

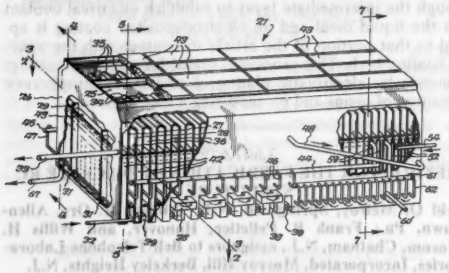
Filed Feb. 26, 1968, Ser. No. 714,156

Int. Cl. B01d *3/10;* **C09f** *5/10*

U.S. Cl. 203—23 **10 Claims**

A process and apparatus for continuously deodorizing glyceride oil in a single vessel of rectangular or annular cross section arranged in and open at its upper end to discharge oil vapors into a vacuum chamber and including an outer low heat exchange section and an inner high heat exchange section, wherein the incoming oil is passed inwardly through the low heat exchange section in a circuitous path to the inner end of the high heat exchange section bypassing the outer end thereof, the outgoing oil is passed outwardly successively through the high and low heat exchange sections in a circuitous path, the incoming oil is heated and the outgoing oil is cooled by counter flow heat exchange relation therebetween in the low heat exchange section, the outgoing oil is heated to deodorizing temperature by passing a high

temperature medium through the high heat exchange section in heat exchange relation with the outgoing oil therein, steam is superheated by passing steam through the high heat exchange section in heat exchange relation to the heated out-



going oil therein, and both the incoming and outgoing oil are permeated with superheated steam bubbles by passing the superheated steam through the oil in the low and high heat exchange sections.

3,607,671

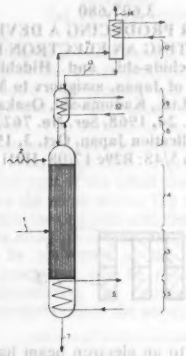
CONDENSING LIQUID CYANURIC CHLORIDE FROM CASES INCLUDING WASHING THE GASES WITH LIQUID PHOSPHOROUS OXYCHLORIDE

Jean Riethmann, and Andreas W. Moerikofer, both of Baselland, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of application Ser. No. 683,571, Nov. 16, 1967, now abandoned. This application July 2, 1970, Ser. No. 49,546

Int. Cl. C07d *55/42*; **B01d** *3/34*, *11/04*

U.S. Cl. 203—50 **8 Claims**



A process for the continuous recovery of substantially pure liquid cyanuric chloride from a gaseous mixture containing the same in mixture with other gases, especially with chlorine, which process involves, after separation from the mixture of a first portion of liquid cyanuric chloride by condensation, recovery of a second portion by dissolving the residual mixture containing the latter in phosphorous oxychloride and fractionation of the resulting solution.

3,607,672

METHOD FOR PRODUCING FIBROUS CARBON STRUCTURES

Charles R. Schmitt, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed Feb. 4, 1970, Ser. No. 8,695

Int. Cl. C01b *31/07*

U.S. Cl. 23—209.1 **6 Claims**

Carbonized fibrous material of improved resiliency and tensile strength is produced by impregnating rayon fibers with a solution of polyethylene or polypropylene dissolved in a volatile hydrocarbon solvent such as xylene, driving off the solvent, and thereafter heating the impregnated fibers to a temperature adequate to carbonize the rayon. After carbonization, the polyethylene-treated fibers showed a marked improvement in resiliency as well as an average tensile strength increase of about 55 percent over untreated fibers of the same type.

3,607,673

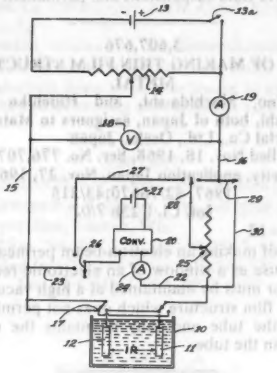
METHOD FOR MEASURING CORROSION RATE

Robert G. Seyl, Evanston, Ill., assignor to Magna Corporation, Santa Fe Springs, Calif.

Filed Mar. 18, 1968, Ser. No. 713,576

Int. Cl. G01n *27/46*

U.S. Cl. 204—1 **4 Claims**



A system for correcting for the IR drop between electrodes when corrosion rate of the electrodes is measured by applying a small DC voltage across the electrodes. Ionic conductor resistance is measured by an AC circuit and the AC circuit is then used to adjust a resistor to an equivalent value whereupon the adjustable resistor is used to add a compensating voltage gain to the voltage applying circuit.

3,607,674

METHOD FOR PRODUCING HOLLOW NEEDLES

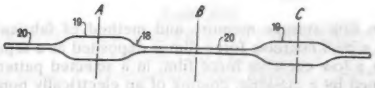
Erik Lauritzen, Gentofte, Denmark, assignor to Niels Bay-Schmith, Mosebakken, Virum, Denmark

Filed Mar. 21, 1968, Ser. No. 719,294

Claims priority, application Denmark, Mar. 28, 1967, 1598/67

Int. Cl. C23b *7/02*, *5/48*, *5/56*

U.S. Cl. 204—9 **2 Claims**



The invention relates to a method for producing hollow needles, such as cannulae, hypodermic needles and the like. A material, such as metal, is applied as discrete particles, e.g. electrogalvanicly, by chemical precipitation or by spraying, to a surface part of a basic body made from an easily shapeable material, such as plastics or glass. The basic body may be solid or tubular, and the metal layer may be applied to the outer and/or inner surface thereof. The basic body may also have such a form that a needle integral with another syringe part is produced. After the application of the basic layer the basic body material may be partly or totally removed, if desired.

3,607,675

MANUFACTURE OF MAGNETIC PARTICLES BY ELECTRODEPOSITION OF IRON, COBALT, OR NICKEL IN DIALKYL SULFOXIDE

Robert S. Haines, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 14, 1969, Ser. No. 791,161
Int. Cl. C22d 5/00; C23f 17/00
U.S. Cl. 204—10 25 Claims

The invention relates to the preparation of fine ferromagnetic particles by electrodeposition of iron, nickel, cobalt, or mixtures of these metals, in a dialkyl sulfoxide bath, such as dimethyl sulfoxide, the particles produced at the electrode being removed at desired intervals. Heat-stable organic binders may be dissolved in the plating bath during electrodeposition to coat the formed particles and thereby inhibit surface oxidation and agglomeration. The particles are oblong in shape and, coated or uncoated, are especially useful for magnetic recording media, magnetic cores, magnetically responsive fluid suspensions and permanent magnets.

3,607,676

METHOD OF MAKING THIN FILM STRUCTURE OF METAL

Yoshihiro Uno, Machida-shi, and Hidehiko Kawakami, Kawasaki-shi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 18, 1968, Ser. No. 776,707
Claims priority, application Japan, Nov. 27, 1967, Dec. 29, 1967, 42/76670;43/215
Int. Cl. C23b 7/02
U.S. Cl. 204—12 4 Claims

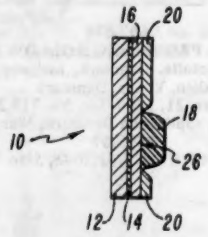
A method of making an electron-beam permeable thin film of metal for use as a window of an electronic recording tube whose interior must be maintained at a high vacuum, so as to obtain a thin film structure which does not permit infiltration of gas into the tube and fully maintains the desired high vacuum within the tube.

3,607,677

METHOD OF MAKING A THIN FILM MEMORY

Irving W. Wolf, and Andre A. Jaecklin, both of Palo Alto, Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Nov. 16, 1965, Ser. No. 508,108
Int. Cl. C23b 5/48, 5/32; G11b 5/00
U.S. Cl. 204—15 3 Claims



A thin film storage memory and method of fabrication, wherein a high coercive force film is deposited as a separate layer on a low coercive force film, in a selected pattern as determined by a masking, coating of an electrically nonconductive material. The invention method is relatively simple due to the invention structure.

3,607,678

ELECTROCOATING

Lowell G. Wise, Cleveland, Ohio, assignor to The Sherwin-Williams Company, Cleveland, Ohio

Filed Dec. 30, 1968, Ser. No. 787,875
Int. Cl. C23b 5/48
U.S. Cl. 204—15 7 Claims

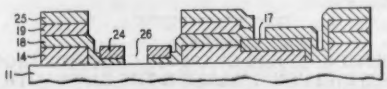
Methods and apparatus for electrocoating a conductive article from an aqueous coating bath by means of a direct current potential applied to the article to be coated through a liquid metal such as mercury. The mercury is contained at the bottom of an electrocoating vessel wherein an intermediate layer of insulating liquid between the liquid metal and the aqueous coating bath prevents direct contact of the bath with the liquid metal. The article to be coated extends through the intermediate layer to establish electrical contact with the liquid meal and an electrodeposited coating is applied to that portion of the article in contact with the aqueous coating bath. This process is useful for applying coatings to metals by electrolytic plating of metals, electrophoretic deposition of resins and by anodizing a metal article.

3,607,679

METHOD FOR THE FABRICATION OF DISCRETE RC STRUCTURE

David O. Melroy, Springfield, N.J.; William H. Orr, Allentown, Pa.; Frank P. Pelletier, Hanover, and Willis H. Yocom, Chatham, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed May 5, 1969, Ser. No. 821,844
Int. Cl. C23b 5/48; C23f 17/00; C23c 15/00
U.S. Cl. 204—15 4 Claims



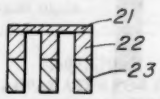
A technique for the fabrication of tantalum-based resistors and capacitors on a single substrate involves a series of process steps wherein an anodic tantalum oxide film initially formed on areas destined for use as either resistors or capacitors serves as an etch stop when removing subsequently deposited tantalum components therefrom.

3,607,680

METHOD FOR PRODUCING A DEVICE FOR TRANSMITTING AN ELECTRON BEAM

Yoshihiro Uno, Machida-shi, and Hidehiko Kawakami, Kawasaki-shi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan

Filed Sept. 24, 1968, Ser. No. 762,047
Claims priority, application Japan, Oct. 3, 1967, 42/64193
Int. Cl. C23b 5/48; B29c 17/08; H01i 33/00
U.S. Cl. 204—24 6 Claims



A device pervious to an electron beam having a partition through which the electron beam is led from one atmosphere to another. The partition is in the form of a thin film of an electron-beam pervious metal oxide such as alumina which has a high mechanical strength that can withstand the pressure difference between the two atmospheres.

3,607,681

METALLIZATION OF CERAMICS

Victor F. G. Cooke, Youngstown, and Sung Ki Lee, Niagara, both of N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Sept. 3, 1969, Ser. No. 855,027
Int. Cl. C23b 5/64
U.S. Cl. 204—30 15 Claims

A method of metallizing ceramics comprises applying to a ceramic substrate, a paste of ingredients comprising phosphorus sesquisulfide, a reducible metal salt and a volatile liquid, and heating the thus-treated substrate to a temperature sufficient to ignite the phosphorus sesquisulfide. The resulting treated surface can be electroless plated and/or electrolytically plated by conventional techniques.

3,607,682

ELECTROPLATING BATHS AND METHODS FOR ELECTROPLATING GOLD ALLOYS AND A PRODUCT THEREOF

Thomas J. Menzel, Daytona Beach, Fla., assignor to KDI Corporation, Fairfax, Ohio

Filed July 17, 1969, Ser. No. 842,704
Int. Cl. C23b 5/42
U.S. Cl. 204—43 6 Claims

Alkaline gold cyanide electrolyte solutions to be employed for depositing gold alloys by an electroplating process, such solutions having incorporated therein a mixture of an alkali metal silver cyanide and ethylenediaminotetraacetic acid and, optionally, alkali metal indium cyanide, processes of electroplating employing such solutions, and electroplated products produced thereby.

3,607,683

BRASS PLATING BATH AND BRIGHTENER COMPOSITION THEREFOR

Daniel Richard France, 1637 West Third St., Brooklyn, N.Y.

Filed Nov. 28, 1969, Ser. No. 880,887
Int. Cl. C23b 5/36, 5/46
U.S. Cl. 204—44 4 Claims

An additive for a brass electroplating bath which comprises (1) an amine such as diethylene diamine; (2) cyanoethyl glycine or cyanoethyl sucrose; (3) sodium or potassium hydroxide; (4) a compound such as lauroyl sarcosine acid; (5) an ethylene oxide condensate; (6) sodium or potassium nitrate and (7) phenol. Typical bath compositions using said additive to deposit brass are disclosed.

3,607,684

MANUFACTURE OF ALKALI METALS

Anselm Thomas Kuhn, Runcorn, England, assignor to Imperial Chemical Industires Limited, London, England

Filed Mar. 8, 1968, Ser. No. 711,600
Claims priority, application Great Britain, Mar. 31, 1967, 14,782/67
Int. Cl. C22d 3/06
U.S. Cl. 204—62 6 Claims

There is provided a process for the manufacture of alkali metal by passing an electroyzing current from an anode to a cathode. The anode is in contact with a fused metal halide salt comprising ions of the alkali metal and no other monovalent cations. The cathode is in the form of liquid alkali metal. Interdisposed between the anode and the cathode is a diaphragm. The diaphragm is polycrystalline ceramic material which has ions of the alkali metal or ions capable of being replaced by the alkali metal. The diaphragm is permeable only to monovalent cations and therefore will pass only the cations of the alkali metal which is being manufactured.

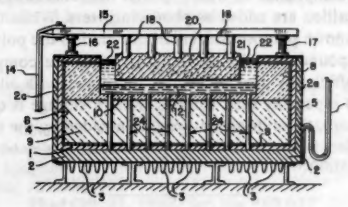
Halogen can be recovered as the anode product or a halogenated hydrocarbon can be recovered as the anode product by introducing a hydrocarbon or partially halogenated hydrocarbon into the anode compartment.

3,607,685

ALUMINUM REDUCTION CELL AND SYSTEM FOR ENERGY CONSERVATION THEREIN

Arthur F. Johnson, 203 Creole Lane, Franklin Lakes, N.J.

Filed Aug. 21, 1968, Ser. No. 754,387
Int. Cl. C22d 3/12, 3/02
U.S. Cl. 204—67 22 Claims



A compact electrolytic potcell for the reduction of aluminum in fluoride fusions including a multiplicity of spaced and sized electrical conductors extending from the reduced aluminum pad underlying the fluoride fusion, through the refractory potlining, and to an aluminum slab heat-sink on the potshell, the conductors being molten where in contact with the pad and solid where in contact with the aluminum slab and the temperature and voltage difference of the slab relative to the pad being adjusted to as low as feasible with cell operation to conserve energy for reduction.

3,607,686

PROCESS FOR THE REDUCTIVE CLEAVAGE OF SULPHONIC ACID GROUPS FROM ANTHRAQUINONE-SULPHONIC ACIDS

Paul Buecheler, Reinach/BL, Switzerland, assignor to Sandoz Ltd., Basle, Switzerland

Filed May 26, 1969, Ser. No. 827,907
Claims priority, application Switzerland, June 5, 1968, 8317/68
Int. Cl. C07b 29/06; C07c 45/00, 87/64
U.S. Cl. 204—73 12 Claims

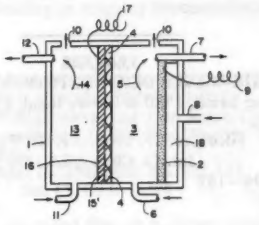
The invention relates to an electrochemical reductive desulphonation of anthraquinone-βsulphonic acids which contain an electron donator as substituent in at least one α-position of the nuclei bearing the sulphonic acid groups.

3,607,687

PROCESS FOR PRODUCING PEROXIDES

Donald H. Grangaard, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Division of Ser. No. 612,515, Jan. 30, 1967, abandoned.
Filed July 29, 1969, Ser. No. 845,739
Int. Cl. C01b 15/00; B01k 3/00
U.S. Cl. 204—84 2 Claims



An electrolytic cell for the production of peroxide having a cathode, an electrolyte-permeable anode, and a diaphragm separating the cathode and anode, the cell being characterized by the position of the anode against the diaphragm such that the anolyte passes through the anolyte compartment on the rearward face of the anode. The process of operation of the cell in which anolyte flow is across the anode only on the anode face remote from the diaphragm.

3,607,688

TREATING SEA WATER WITH PRODUCTION OF CHLORINE AND FERTILIZER

Seiichi Inoue, 3, Hayakurakuen-cho, Nara-shi, Nara-ken; Kuniichi Hayashi, Yamaguchiken; Minoru Tamura, Yamaguchiken, and Masaya Kamiyoshi, Yamaguchiken, all of Japan

Filed Jan. 17, 1969, Ser. No. 792,152
Int. Cl. B01k 1/00
U.S. Cl. 204—90 6 Claims

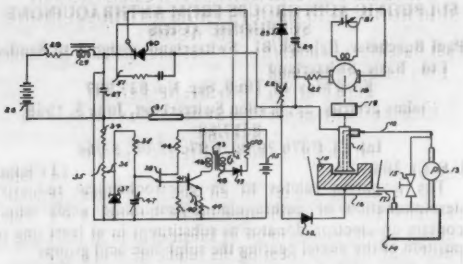
This method of purifying sea water, together with the production of chlorine and fertilizer, consists of treating saline water in a two-compartment electrolytic cell in which the two compartments of the cell are separated by a porous membrane. The saline water is electronically treated to produce potable water, as well as chlorine and a fertilizer which is commercially usable in agriculture.

3,607,689

POWER SUPPLY FOR LARGE-SURFACE ELECTROCHEMICAL MACHINING

Kiyoshi Inoue, 100 Sakato, Kawasaki, Kanagawa, Japan

Filed Aug. 6, 1968, Ser. No. 750,576
Claims priority, application Japan, Oct. 17, 1967, Jan. 17, 1968, 42/66787;43/2519
Int. Cl. B23p *1/00, 1/02;* B01k *3/00*
U.S. Cl. 204—143 R **11 Claims**



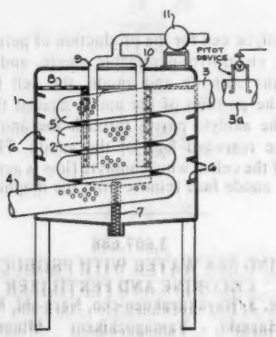
A system for the electrochemical machining of metallic workpieces over large areas in which a storage impedance (e.g. a capacitor) is intermittently charged and discharged via a solid-state controlled rectifier switching circuit to apply periodic unidirectional electrolysis pulses of a current magnitude substantially greater than that of the charging source to the electrode system consisting of a tool electrode and the metallic workpiece while an electrolyte is circulated through the gap therebetween.

3,607,690

AIR-WATER DEPOLLUTION SYSTEMS

John Weber Brant, 1780 B Devers Road, Colony Park Apts., York, Pa.

Filed Apr. 17, 1968, Ser. No. 722,083
Int. Cl. C02b *1/82, 1/00*
U.S. Cl. 204—151 **8 Claims**



An air-water depollution system is described. The system includes a number of subsystems which precipitate particulates from gaseous emissions, cool the emission, and mix it with cold water to form an electrolyte for subsequent electrochemical and/or oxidative use. The electrolyte source may be mixed with waste water and the resulting mixture processed in an electrochemical processing unit which produces a cleansed effluent ready for reuse.

3,607,691

SYSTEM FOR THE REDOX PHOTOPOLYMERIZATION OF VINYL MONOMERS IN THE PRESENCE OF PERIODATES

Gershon M. Goldberg, Arlington, and Robert J. Allen, Saugns, both of Mass., assignors to Technical Operations, Incorporated, Burlington, Mass.

Filed July 9, 1968, Ser. No. 743,526
Int. Cl. C08d *1/00;* C08f *1/16*
U.S. Cl. 204—159.23 **15 Claims**

A visible light activated photopolymerization system is disclosed. The polymerization mixture contains a vinyl monomer, a reducible dye and reducing agent as the photopolymerization initiator, and a strong oxidizing agent. It is found that the presence of the strong oxidizing agent materially increases the rate of polymer formation over the same mixture in the absence of the strong oxidizing agent, particularly at the early stages of the photopolymerization reaction.

3,607,692

PROCESS FOR THE RADIATION PRODUCTION OF POROMERIC MATERIALS

Axe Sanner, Ludwigshafen, and Carl Heinrich Krauch, Heidelberg, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Sept. 17, 1969, Ser. No. 858,839
Claims priority, application Germany, Sept. 21, 1968, P 17 95 378.5
Int. Cl. B01j *1/10, 1/12;* C08c *17/08*
U.S. Cl. 204—159.12 **5 Claims**

Production of poromeric materials by impregnating flat fibrous structures with liquids containing monoolefinically unsaturated monomers and high polymeric plastics in dissolved, emulsified or dispersed form, but no polyolefinically unsaturated monomers, freezing the impregnated fibrous structures, irradiating the frozen structures to effect polymerization of the monomers, and freeing the poromeric materials from the remaining liquid. The poromeric materials may be used as floor coverings, insulating materials, leather substitutes and coating materials.

3,607,693

POLYESTER COMPOUNDS WHICH ARE HARDENABLE BY ULTRAVIOLET RADIATION IN THE PRESENCE OF AN α-SUBSTITUTED BENZOIN ETHER

Hans-Georg Heine, Krefeld; Karl Fuhr, Krefeld; Hans Rudolph, Krefeld-Bockum, and Hermann Schnell, Krefeld-Uerdingen, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 2, 1969, Ser. No. 838,638
Claims priority, application Germany, July 26, 1968, P 17 69 854.3
Int. Cl. C08f *1/00, 21/00*
U.S. Cl. 204—159.15 **5 Claims**

The present invention relates to compounds which contain at least one activated carbon-carbon double bond and which can be polymerized by ultraviolet irradiation and to mixtures of such compounds to which special benzoins substituted in the α-position are added as photosensitizers. While the addition of known photosensitizers of this kind to the polymerizable compounds has the disadvantages that the compositions are insufficiently reactive when irradiated with ultraviolet rays and especially their stability in dark storage is quite unsatisfactory, these disadvantages are avoided by the use of α-substituted benzoin ethers as photosensitizers according to the invention.

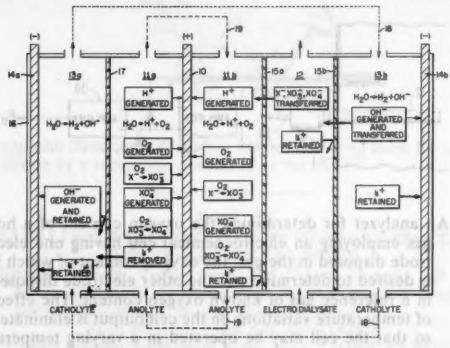
ERRATUM

For Class 204—167 see:
Patent No. 3,608,039

3,607,694
PER(HALO-OXYGEN) ACID OXIDATION, PURIFICATION AND RECOVERY PROCESS

Allyn Harold Heit, Mount Holly, and James Norris Williamson, Marlton, both of N.J., assignors to Sybron Corporation, Rochester, N.Y.

Filed Apr. 8, 1968, Ser. No. 719,361
Int. Cl. B01d *13/02*
U.S. Cl. 204—180 P **4 Claims**



An electrodialytic apparatus utilizing anion and cation permselective membranes and having at least one two-chamber cell for purification and at least one three-chamber cell proximal the two-chamber unit for concentration of aqueous per(halo-oxygen) acids and their salts, all anolyte chambers sharing a common anolyte stream, all catholyte chambers sharing a common catholyte stream, and at least one of the anolyte chambers of the purification and the concentration cells sharing a common anode. A multistep process for recovering and regenerating the periodate oxidant used in preparing oxidized polysaccharides in which the primary liquor and subsequent wash liquors from the oxidized polysaccharide filter cake are circulated in the anolyte and middle chambers of the electrodialytic apparatus having two-chamber and three-chamber cells for reoxidation and concentration respectively, the liquors having a concentration of 1 to 15 weight percent being circulated in the anolyte chambers; those liquors having a concentration of 0.5 to 5 weight percent being circulated in the middle chamber, all liquors and effluents having a concentration of less than 0.5 weight percent being passed through a strong base anion exchange resin which removes the remaining periodate or chemically reduced periodates, which are subsequently eluted by the sodium hydroxide catholyte, which in turn is circulated in the anolyte chambers of the apparatus for regeneration.

3,607,695
HEMOGLOBINOPATHY CONTROLS

Paul Schneider, Spring Valley, N.Y., assignor to Chas. Pfizer & Co., Inc., New York, N.Y.

Filed Feb. 14, 1969, Ser. No. 799,526
Int. Cl. B01k *5/00*
U.S. Cl. 204—180 S **6 Claims**

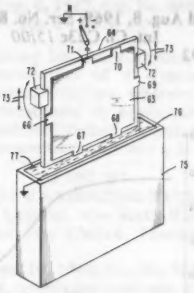
A diagnostic method for the detection of abnormal hemoglobins in the blood of humans by conversion to cyanmethemoglobins and electrophoretic comparison with similarly treated hemoglobin controls.

3,607,696
REVERSIBLE ELECTROPHORESIS AND APPLICATIONS THEREOF

Blair E. Cornish, Stone Ridge; Eugene P. Damm, Jr., Poughkeepsie, and Sidney L. Phillips, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 21, 1968, Ser. No. 769,027
Int. Cl. B01k *5/02*; **C23b** *13/00*
U.S. Cl. 204—181 **12 Claims**

Normally difficult to remove coatings of certain polymeric substances, including a polytetrafluoroethylene, are removed by the presently disclosed electrical stripping technique. The coatings are deposited by electrophoresis on a conductive surface of an object used as an electrode and stripped or removed from the same surface by applying a voltage of opposite polarity while the coating particles are still in an uncoalesced condition due to retention of electrolyte fluid between the particles. Certain of these coatings are strippable even after removal of the base electrode from the electrolyte medium, provided that sufficient electrolyte moisture is retained to keep the coating in a solvated condition until reimmersion and application of the reverse voltage. The deposition and stripping actions are repeatable an indefinite number of times for particular coating substances under particular conditions. This is used in a closed system to construct specific devices based on selectively variable thermal resistance effects and visual indication effects. These effects have an associated memory property in the sense that the effect persists indefinitely upon removal of the electromotive force which is depositing or stripping the coating.



3,607,697
SPUTTERING PROCESS FOR MAKING A FILM OF SILICA AND SILICON NITRIDE

George A. Shirn, Williamstown, and Alan Janus, Charlemont, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.

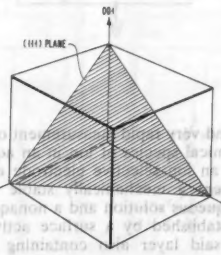
Filed Apr. 18, 1968, Ser. No. 722,447
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 **3 Claims**

Formation of a sputtered film on a silicon substrate, said film being a graded composition ranging from pure SiO_2 to pure Si_3N_4 and the composition resulting therefrom.

3,607,698
EPITAXIAL GARNET FILMS

Eric Kay, Kensington, and Erich Sawatzky, San Jose, both of Calif., assignors to International Busines Machines Corporation, Armonk, N.Y.

Filed Oct. 11, 1968, Ser. No. 766,698
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 **3 Claims**



A method of making improved garnet thin films in a sputtering apparatus. The film is sputtered from a source containing yttrium or rare earth garnet in bulk form onto a garnet

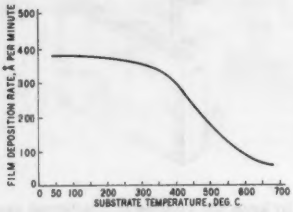
substance. Epitaxial films with square hysteresis loops are obtained only when the garnet substrate is in the (111) orientation.

3,607,699

TECHNIQUE FOR THE DEPOSITION OF GALLIUM PHOSPHIDE RESISTIVE FILMS BY CATHODIC SPUTTERING

Jacob Sosniak, Millburn, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Aug. 8, 1969, Ser. No. 848,612
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 **5 Claims**



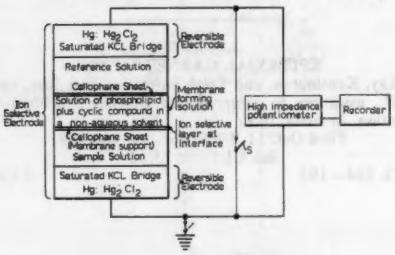
Gallium phosphide thin films manifesting resistivities within the rage of 10 to 10^6 ohm-centimeters are obtained by cathodic sputtering of gallium phosphide at controlled temperatures and deposition rates. The resistivity of the sputtered films may increased to 10^8 ohm-centimeters by annealing at elevated temperatures.

3,607,700

ELECTRODE FOR MEASURING POTASSIUM AND OTHER SPECIFIC ION ACTIVITIES

Daniel C. Tosteson, Orange County, N.C., assignor to Duke University, Inc., Durham, N.C.

Filed Dec. 20, 1967, Ser. No. 692,065
Int. Cl. G01n *27/30, 27/40*
U.S. Cl. 204—195 **4 Claims**



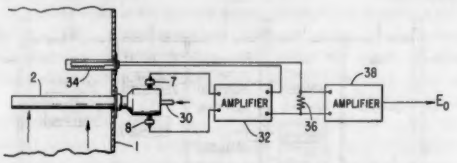
The direct and very rapid measurement of the activity of a particular chemical species of ion in an aqueous solution is achieved with an ion selective electrode embodying as the selective element a mechanically stable layer established between the aqueous solution and a nonaqueous phase, said layer being established by a surface active agent such as phospholipid, said layer also containing an ion selective macrocyclic compound such as valinomycin and said agent and macrocyclic compound being dissolved in a solvent which forms the nonaqueous phase. High selectivity for potassium ions, in particular, is achieved.

3,607,701

ELECTROCHEMICAL ANALYZER FOR MEASURING THE OXYGEN CONTENT OF HOT GASES

Peter J. Wheeler, Carshalton Beeches, England, assignor to Bailey Meters & Controls Limited, Purley Way, Croydon, Surrey, England

Filed Jan. 5, 1968, Ser. No. 696,060
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **3 Claims**



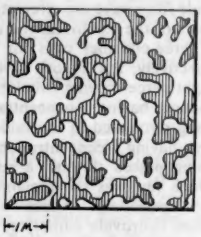
An analyzer for determining the oxygen content of a hot gas employing an electrochemical cell having one electrode disposed in the gas, the oxygen content of which it is desired to determine and the other electrode disposed in a reference gas of known oxygen content. The effect of temperature variations on the cell output is eliminated so that the cell may be operated in a varying temperature environment thus making it particularly adaptable for in situ applications.

3,607,702

ELECTROCHEMICAL APPARATUS

Wolfgand Haller, 5400 Pooks Hill Road, Apt 912, Bethesda, Md.

Filed Feb. 5, 1968, Ser. No. 702,873
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 **8 Claims**



An electrolytic junction membrance for the measuring of ionic potential in electrolytes is formed of a glass body having a continuous interconnected system of pores of an average, and preferably substantially uniform, pore-diameter between about 125 A. and 1,700 A. and preferably not above 250 A., and wherein the ratio of pore-volume to glass-volume is between about 1:2 and 2:1; and a method of producing such glass body by heating glass above its melting point so as to form two distinct phases therein, solidifying the glass while maintaining said distinct phases, and removing one of the two distinct phases by leaching.

3,607,703

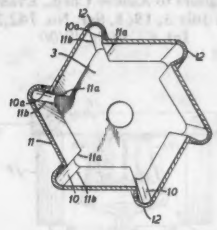
PLATING APPARATUS

George Hadley, deceased, late of Petts Woods, Kent, England (by Edith Emily Hadley and Jean Winifried Hadley, executrices), assignor to Electrochemical Development Limited

Filed May 6, 1968, Ser. No. 727,760
Claims priority, application Great Britain, May 9, 1967, 21522/67
Int. Cl. C23b *5/78*
U.S. Cl. 204—213 **4 Claims**

A processing barrel having a peripheral wall and supports for rotation about a horizontal axis, a discharge element

being provided which in one sense of rotation allows articles to move relative to the wall about the barrel axis and in the



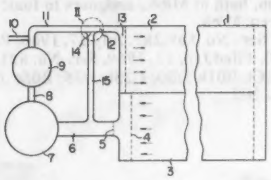
opposite direction will lift the articles and drop them for collection by a receptacle positioned in the barrel.

3,607,704

ALKALI SALT ELECTROLYSIS BY MERCURY PROCESS AND APPARATUS THEREFOR

Hiroshi Shibata; Teruo Imai, and Shigeji Kumaki, all of Iwaki-shi, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Chuo-ku, Tokyo-to, Japan

Filed Mar. 21, 1968, Ser. No. 715,046
Claims priority, application Japan, Apr. 5, 1967, 42/21227
Int. Cl. C01d *1/08*
U.S. Cl. 204—220 2 Claims



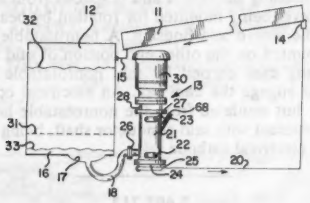
In an alkali salt electrolysis operation by the mercury process in which mercury recovered in a denuding tower is recirculated with wash water through a return passageway to return to an electrolysis vessel, a large portion of this mecury is thus returned to the electrolysis vessel, and the remainder portion of the mercury, together with the wash water and mecury emulsion floating and flowing above it, undergo auxiliary recirculation back to the denuding toward.

3,607,705

PUMPING SYSTEM

James Nagle, 20536 Greenwood Drive, Olympia Fields, Ill.

Filed Apr. 14, 1969, Ser. No. 815,909
Int. Cl. C22d *1/04*; B01k *3/00*
U.S. Cl. 204—220 6 Claims



A pumping arrangement particularly adapted for use to pump mercury from a decomposer to a mercury cell. The novel arrangement permits removal of the impeller, shaft and motor and replacement or inspection without draining the system while significantly reducing the volume of mercury required when compared with prior art pumps. The pumping arrangement provides space for sealing water to be located over the mercury to preclude contact between air and the mercury cell. The simplified pump arrangement eliminates the need for dynamic seals between the pressurized fluid and the atmosphere, as there are no wetted bearings or rubbing parts in the area of the pumping chamber.

3,607,706

METHOD OF MAKING STABLE LAMINATED CATION-EXCHANGE MEMBRANES

John L. Eisenmann, Hingham; Edward T. Roach, Arlington, and Anthony Scieszko, Dorchester, all of Mass., assignors to Ionics, Incorporated, Watertown, Mass.

Filed Aug. 4, 1967, Ser. No. 660,563
Int. Cl. B01k *3/10*
U.S. Cl. 204—296 9 Claims

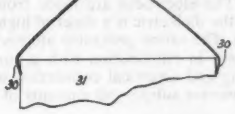
A method of making laminated multilayered, reinforced, cation-exchange membranes of a styrene-divinylbenzene, diethylbenzene solvated structure, whereby the organic solvating medium is substituted by equilibration with a polar solvent, such as methanol, before the polymerized structure is sulfonated with concentrated sulfuric acid.

3,607,707

PLATING AND ANODIZING BATH RACKS

Paul A. Chenevier, Lugarno, New South Wales, Australia, assignor to Raynors Pty. Limited, Punchbowl, New South Wales, Australia

Filed Sept. 10, 1968, Ser. No. 758,833
Claims priority, application Australia, Feb. 5, 1968, 33082/68
Int. Cl. C23b *5/70*
U.S. Cl. 204—297 R 4 Claims



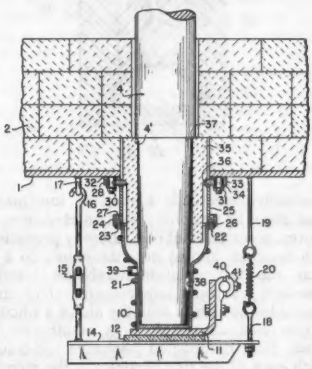
A plating or anodizing rack with a supporting structure having at least one socket recess through it and a detachable spring clip inserted into the recess. The clip has a U-shaped resilient body with two arms extending from a junction point, the edges of the clip making a line contact with the surface of the recess and frictionally engage it.

3,607,708

ELECTRODE SUPPORT

John C. Priscu; Linden E. Snyder, and Eldon R. Poulsen, all of Las Vegas, Nev., assignors to Titanium Metals Corporation of America, West Caldwell, N.J.

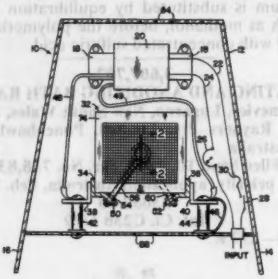
Filed Mar. 26, 1969, Ser. No. 810,603
Int. Cl. C23b *5/70*; B01k *3/04*
U.S. Cl. 204—297 R 5 Claims



An improved electrode support arrangement comprising a can adapted to surround an end of the electrode located ex-

teriorly of a cell and conduct current to the electrode, a cylindrical member extending from the open end of the can and insulated from the can, a ceramic sleeve adapted to support an electrode located within the cylindrical member and supported on a lip carried on the cylindrical member and means to independently support the cylindrical member and the can.

3,607,709
OZONE GENERATOR
William H. Rice, Akron, Ohio, assignor to Air and Water Purification, Inc., Akron, Ohio
Filed Mar. 13, 1969, Ser. No. 806,796
Int. Cl. C01b *13/12*
U.S. Cl. 204—317 9 Claims

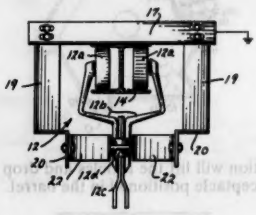


This invention relates to an ozone generator basically comprised of at least two electrodes having a dielectric therebetween. The electrodes are made from stainless steel wire mesh and the dielectric is a sheet of high quality material such as mica. The ozone generator utilizes a relatively low amperage current in conjunction with a compact and simplified mounting and electrical connection of the generator to effectively provide substantial amounts of ozone for purifying purposes.

3,607,710
SEAL FOR ION-SELECTIVE ELECTRODE
Gerard M. Farren, Lombard, and John J. Staunton, Oak Park, both of Ill., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.
Continuation-in-part of application Ser. No. 750,305, Aug. 5, 1968, now abandoned. This application Feb. 14, 1969, Ser. No. 799,385
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 6 Claims

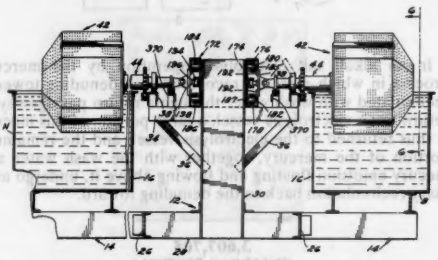
An ion-selective electrode having its ion-transfer membrane sealed about its periphery with an elastomeric material free of fissures, voids and bubbles, thereby providing an electrode which responds almost instantaneously to a change to potential at the test solution-membrane interface. The preferred sealant is a room temperature vulcanizing silicone rubber bonded to the crystal with the aid of a silicone primer. The invention also contemplates a membrane (substitute crystal) made from compacted microsize ion-transfer particles in which each of the tiny particles in the membrane face which contacts the test solution is coated with an elastomeric water impervious film e.g. a room temperature vulcanizing silicone rubber.

3,607,711
ELECTROCOATING EQUIPMENT
Robert L. Koch, II, and Forest J. Greenwood, both of Evansville, Ind., assignors to Ashdee Corp., Evansville, Ind.
Filed July 3, 1968, Ser. No. 742,246
Int. Cl. B65g *49/00*
U.S. Cl. 204—198 4 Claims



A hanger assembly for electrocoating equipment characterized by the use of a series of resilient metal bus springs, at ground electrical potential, which continually urge into engagement with the drive chain and/or the moving hangers for the parts during coating to maintain the hangers and the parts also at ground electrical potential.

3,607,712
BARREL-TYPE PROCESSING APPARATUS
James Barton, Grosse Pointe Woods, and Patrick H. Norton, Birmingham, both of Mich., assignors to Ionic International Inc.,, Warren, Mich.
Division of Ser. No. 568,287, July 27, 1966, Pat. No. 3,521,650. Filed Jan. 21, 1969, Ser. No. 821,533
Int. Cl. B01k *3/00*; C23b *5/78*; B05c *3/00*
U.S. Cl. 204—202 7 Claims

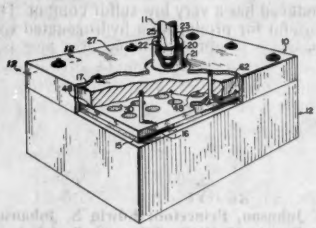


A cam rail moves an arm assembly into and out of a treating solution, the assembly comprising an elongated nonrotatable tubular sleeve resiliently urged in contact with an end of a conductor shaft mounted in but insulated from said sleeve. A housing surrounds and is spaced from end portion of said sleeve, being mounted for rotation by bearing means between the sleeve and housing. A nonrotatable housing is fixedly mounted on the other end portion of said sleeve, and a supporting cam carried by said nonrotatable housing is adapted to engage the cam rail. An electrical contact shoe carried by but insulated from the nonrotatable housing is in electrical contact with said conductor shaft, being adapted to engage an electrical cathode rail.

3,607,713
ANODE FOR PRODUCTION OF ALUMINUM METAL
Lloyd H. Brown, Crystal Lake, and David D. Watson, Barrington, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.
Filed May 7, 1969, Ser. No. 822,416
Int. Cl. B01k *3/04*; B32b *31/20*
U.S. Cl. 204—290 R 9 Claims

Carbon anode for use in aluminum extraction is attached to a metallic stub by means of a carbon-rich furfuryl alcohol-

derived resin mortar and a flat perforated metal plate which



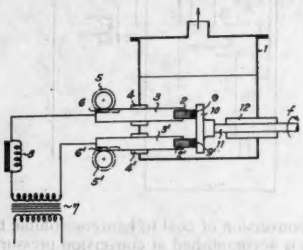
has a plurality of perforations, the sidewalls of which taper upwardly and outwardly.

3,607,714

DEVICE FOR CRACKING ORGANIC PRODUCTS IN LIQUID PHASE BY MEANS OF AN ELECTRIC ARC

Andre C. Vialaron, La Barthe De Neste, France, assignor to Ugine Kuhlmann, Paris, France

Filed Feb. 4, 1969, Ser. No. 796,353
Claims priority, application France, Feb. 7, 1968, 138,966
Int. Cl. C22d *7/08*
U.S. Cl. 204—326 **8 Claims**



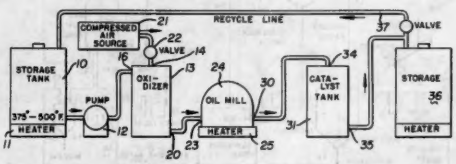
A device for the cracking of organic products in liquid phase by means of a submerged intermittent electric arc wherein the electric arc is produced between stationary electrodes and movable electrodes which are secured to a rotary support at uniform angular intervals over a circumference which is cocentric with the axis of rotation of said support. The stationary electrodes and the movable electrodes which are in cooperating relation therewith are so arranged that the free extremities of the movable electrodes come successively into contact with the free extremities of the stationary electrodes in a plane at right angles to the axis of rotation of the movable electrode support.

3,607,715

METHOD OF OXIDIZING ROOFING ASPHALT

Everett H. Crawley, Lexington, Ky., assignor to Volcanic Heater Inc., Alliance, Ohio

Filed Mar. 28, 1969, Ser. No. 811,518
Int. Cl. C10c *3/04*
U.S. Cl. 208—6 **1 Claim**



A method and apparatus for oxidizing roofing asphalt is disclosed in which heated liquid asphalt is subjected to air entrainment in an oxidizer tank supplied with a suitable air source, the air and asphalt mix is then mechanically mixed by an oil mill and passed through a catalyst tank so as to provide a large surface area for a relatively thin asphalt film enabling complete oxidation thereof. The resulting asphalt product is light, contains air and penetrates paper and felt much better than asphalt not so treated. Additionally, the treated asphalt covers a greater area and remains in a stable condition, thus, contributing economically to the formation of roofing shingles and the like.

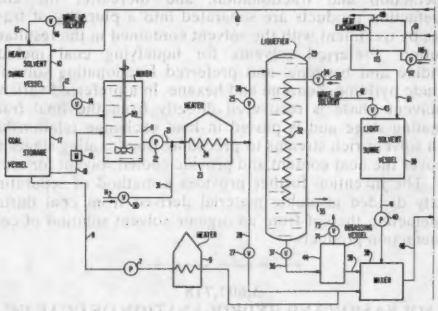
The apparatus includes an oxidizer tank which has horizontally positioned apertured baffles and through which the asphalt and air from a suitable source are forcibly directed, an oil mill in which a series of circular saws and spacers revolve within a housing divided into a number of attrition chambers through which the asphalt and air mixture is pumped so as to thoroughly intermix the air in the asphalt. The thoroughly mixed air and asphalt are then moved into a catalyst tank which is filled with raschig rings and which catalyst tank provides a large surface area for the thin asphalt film that forms thereover and enables the complete oxidation of the air asphalt mixture to be obtained. The asphalt product is then passed to heated storage and/or recycled if necessary and desirable.

3,607,716

FRACTIONATION OF COAL LIQUEFACTION PRODUCTS IN A MIXTURE OF HEAVY AND LIGHT ORGANIC SOLVENTS

Jack W. Roach, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Jan. 9, 1970, Ser. No. 1,690
Int. Cl. C10g *1/00*
U.S. Cl. 208—8 **31 Claims**



Coal liquefaction products are separated into a plurality of fractions of varying softening points and molecular complexity in a solvent mixture containing a heavy organic coal liquefaction solvent and a light organic fractionating solvent having a critical temperature below 800° F. under elevated temperature and pressure conditions. In one variant, coal is liquefied with a heavy organic coal liquefaction solvent, the light organic fractionating solvent is added to the solution thus produced, and thereafter the coal liquefaction products are separated into a plurality of fractions at elevated temperature and pressure. Preferred heavy organic solvents include anthracene oil, tetralin, catalytic cracker recycle stocks, thermally cracked stocks and lubricating oil aromatic extracts, and preferred light organic solvents include pyridine, benzene and hexane. In a preferred variant, a mixture of the light and heavy organic solvents is recovered directly from the final fractionating stage, the solvent mixture is separated in a solvent separating vessel directly into a heavy organic solvent phase and a light organic solvent phase, and the two solvent phases are passed in heat exchange relationship with incoming solvent-rich streams to preceding fractionating stages to recover the heat content and produce cooled liquid heavy and light organic solvent streams for recycle. The invention further provides a method of separating finely divided insoluble material from products

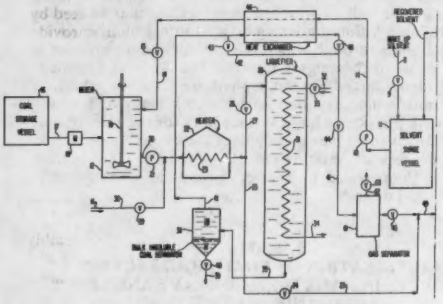
of coal liquefaction present in a solvent comprising a heavy organic coal liquefaction solvent.

3,607,717

FRACTIONATING COAL LIQUEFACTION PRODUCTS WITH LIGHT ORGANIC SOLVENTS

Jack W. Roach, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Jan. 9, 1970, Ser. No. 1,818
Int. Cl. C10g *1/00*
U.S. Cl. 208—8 28 Claims



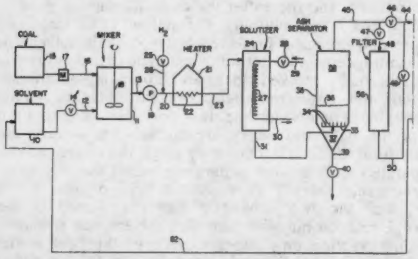
Coal liquefaction products are separated into a plurality of fractions of varying softening points and molecular complexity by treatment with light organic solvents having critical temperatures below 800° F. under elevated temperature and pressure conditions. In one variant, coal is liquefied employing selected light organic solvents which are suitable for both liquefaction and fractionation, and thereafter the coal liquefaction products are separated into a plurality of fractions by treatment with the solvent contained in the resultant solution. Preferred solvents for liquefying coal include pyridine and benzene, and preferred fractionating solvents include pyridine, benzene and hexane. In a preferred variant, a solvent phase is recovered directly from the final fractionating stage and is passed in heat exchange relationship with solvent-rich streams to preceding fractionating stages to recover the heat content and provide cooled solvent for recycle. The invention further provides a method of separating finely divided insoluble material derived from coal during liquefaction thereof from an organic-solvent solution of coal liquefaction products.

3,607,718

SOLVATION AND HYDROGENATION OF COAL IN PARTIALLY HYDROGENATED HYDROCARBON SOLVENTS

William M. Leaders, and Jack W. Roach, both of Oklahoma City, Okla., assignors to Kerr-McGee Corporation, Oklahoma City, Okla.

Filed Jan. 9, 1970, Ser. No. 1,689
Int. Cl. C10g *1/06*
U.S. Cl. 208—10 30 Claims



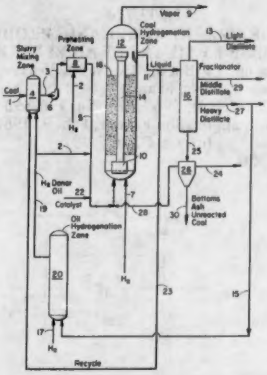
Coal is solubilized and hydrogenated in partially hydrogenated hydrocarbon streams such as clarified slurry oil to produce a nonviscous solution which is readily deashed by settling or filtering. Both inorganic sulfur and organically combined sulfur are removed, and the deashed solubilized coal thus produced has a very low sulfur content. The invention is also useful for producing a hydrogenated solubilized coal solution which is suitable for use as a feedstock for a petroleum refinery, and valuable liquid hydrocarbon distillate products boiling, for example, within the gasoline, kerosene, naphtha, light fuel oil and gas oil ranges may be produced therefrom.

3,607,719

LOW-PRESSURE HYDROGENATION OF COAL

Clarence A. Johnson, Princeton; Edwin S. Johanson, Princeton, and Ronald H. Wolk, Trenton, all of N.J., assignors to Hydrocarbon Research, Inc., New York, N.Y.

Filed Nov. 13, 1969, Ser. No. 876,454
Int. Cl. C10g *1/08*
U.S. Cl. 208—10 4 Claims



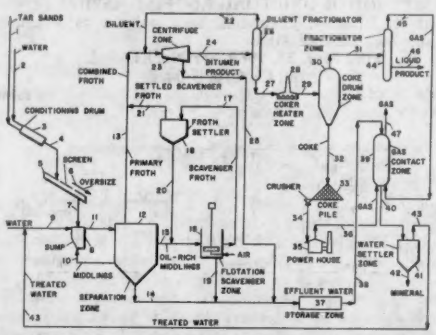
The hydroconversion of coal to benzene-soluble hydrocarbon products is accomplished at conversion pressures with a hydrogen partial pressure of less than about 1,000 p.s.i. in the presence of a hydrogen donor oil and a particulate contact material. Under these operating conditions, the particulate contact material is maintained in random motion. Hydrogen partial pressures as low as 350 p.s.i. are practical and economical. From the resulting liquid effluent, a distillate fraction is recovered and it is further hydrogenated to produce an effective hydrogen donor oil.

3,607,720

HOT WATER PROCESS IMPROVEMENT

Joseph F. Paulson, Claymont, Del., assignor to Great Canadian Oil Sands Limited, Toronto, Canada

Filed July 17, 1968, Ser. No. 745,543
Int. Cl. C10g *1/04*
U.S. Cl. 208—11 9 Claims



The specification discloses an improvement to the hot water process for treating bituminous tar sands. By the inven-

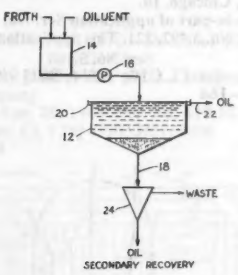
tion water discharged from the hot water process is contacted with a gaseous effluent from the upgrading of bitumen to synthetic crude, the gaseous effluent containing sulfur dioxide, carbon dioxide, hydrogen sulfide, or mixtures of these gases. The contacting between the water and the effluent followed by settling produces clarified water which can be reused in the hot water process.

3,607,721

PROCESS FOR TREATING A BITUMINOUS FROTH

Elmer Nagy, Edmonton, Alberta, Canada, assignor to Cities Service Athabasca, Inc.; Imperial Oil Limited; Atlantic Richfield Corporation and Royalite Oil Company Limited, part interest to each

Filed June 30, 1969, Ser. No. 837,749
Int. Cl. C10g *1/04*
U.S. Cl. 208—11 5 Claims



A method for the removal of solids and emulsified water from a bituminous froth resulting from the hot water treatment of Athabasca tar sands. The froth is diluted with a light hydrocarbon diluent such as coker naphtha and fed to a settling vessel where the solids and water droplets settle out in the form of a sludge constituting a concentrated stable emulsion containing most of the impurities. The substantially purified bituminous froth is withdrawn as overflow. The settled sludge is removed from the bottom of the vessel at rates of between 4 and 5 percent by volume of the diluted bituminous froth feed rate and centrifuged to recover its oil content.

3,607,722

ASPHALT MANUFACTURE

Gordon A. McLaren, Westport, Conn., and John W. Gibson, Oakland, Calif., assignors to Shell Oil Company, New York, N.Y.

Filed Nov. 28, 1969, Ser. No. 880,629
Int. Cl. C10G *3/02*
U.S. Cl. 208—44 5 Claims

Asphalt products having improved rheological properties are prepared from asphaltic residues by means of catalytic hydrogenation under moderate conditions.

3,607,723

SPLIT FLOW HYDROCRACKING PROCESS

Reese A. Peck; Raymond F. Wilson, and Frank E. Guptill, Jr., all of Fishkill, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 28, 1969, Ser. No. 811,604
Int. Cl. C10g *13/00, 37/02*
U.S. Cl. 208—59 10 Claims

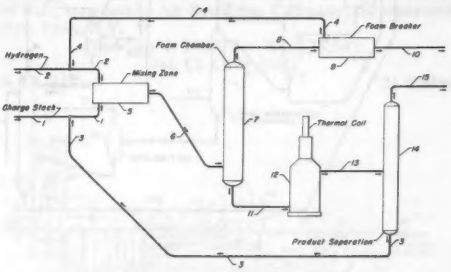
A hydrocracking process for the substantially complete hydrocracking of a heavy hydrocarbon charge stock by introducing a heavy hydrocarbon charge stock into a catalyst zone comprising a first catalyst zone below and a second catalyst zone above the point of entry of the charge stock, in the presence of hydrogen which is introduced in countercurrent relationship to said charge stock in first catalyst zone and maintained at a rate sufficient to provide for lower boiling liquid contact of the second catalyst zone followed by recycling the remaining hydrocarbon material from the first catalyst zone to the charge stock.

3,607,724

SEPARATION OF ASPHALTENES AND CONVERSION OF BLACK OILS

Rogers, Edward S., Hinsdale, and Edward Horvath, Hickory Hills, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 17, 1969, Ser. No. 885,858
Int. Cl. C10c *3/00*
U.S. Cl. 208—86 5 Claims



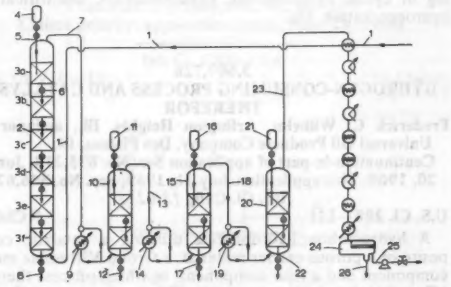
Removal of asphaltenes from a hydrocarbonaceous black oil is effected through the use of a foam chamber and a foam breaker. In one application, the asphaltene-free material is thermally cracked and the heavier portion of the cracked effluent is recycled to combine with the fresh feed. The foam is created through the use of high-pressure hydrogen, being intimately admixed with the black oil, followed by depressuring into a foam chamber.

3,607,725

HYDROCRACKING PROCESS

Robert L. Irvine, Rob Nes, Pyle Hill, Woking, Surrey, England

Filed Mar. 25, 1969, Ser. No. 810,127
Claims priority, application Great Britain, Mar. 27, 1968, 14630/68
Int. Cl. C10g *23/10*
U.S. Cl. 208—89 18 Claims



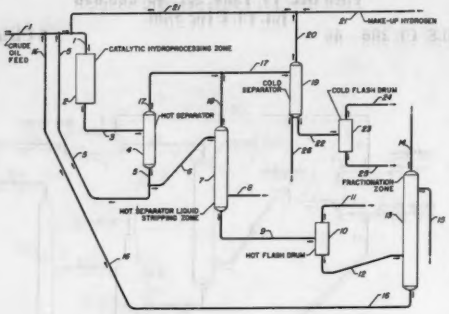
The invention relates to the hydrogenation of non-hydrocarbons in crude or residua feed by the catalytic hydrogenation of the feed using a multibed reactor with descending catalyst and ascending feed, the conditions being so adjusted to produce fluidization of catalyst particles in each bed. The process is particularly suitable for treatment of crude or residua to be subjected to hydrocracking.

3,607,726

RECOVERY OF HYDROGEN

Newt M. Hallman, Prospect, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 29, 1969, Ser. No. 795,123
Int. Cl. C10g *13/00*
U.S. Cl. 208—108 8 Claims



Hydrogen is recovered from a normally liquid hydrocarbon fraction produced by the catalytic hydroprocessing of a petroleum crude oil feedstock utilizing a hot separator liquid stripping zone and high pressure superheated steam as the stripping medium.

3,607,727

HYDROPROCESSING OF HYDROCARBONS

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of application Ser. No. 828,762, May 28, 1969. This application July 7, 1969, Ser. No. 839,643
Int. Cl. C10g *13/02*
U.S. Cl. 208—111 9 Claims

A process for hydrotreating (hydroprocessing) hydrocarbons and mixtures of hydrocarbons utilizing a catalytic composite of a porous carrier material, a Group VIII noble metal component and a germanium component, in which process there is effected a chemical consumption of hydrogen. A specific example of one such catalyst is a composite of a crystalline aluminosilicate, a platinum component and a germanium component, for utilization in a hydrocracking process. Other hydrocarbon hydroprocesses are directed toward the hydrogenation of aromatic nuclei, the ring-opening of cyclic hydrocarbons, desulfurization, denitrification hydrogeneration, etc.

3,607,728

HYDROGEN-CONSUMING PROCESS AND CATALYST THEREFOR

Frederick C. Wilhelm, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of application Ser. No. 835,218, June 20, 1969. This application July 31, 1969, Ser. No. 846,622
Int. Cl. C10g *13/02*
U.S. Cl. 208—111 9 Claims

A hydrocarbon hydroprocess utilizing a catalytic composite of a porous carrier material, a Group VIII noble metal component and a lead component, in which process there is effected a chemical consumption of hydrogen. A specific example of one such catalyst is a composite of a crystalline aluminosilicate, a platinum component and a lead component, for utilization in a hydrocracking process. Other hydrocarbon hydroprocesses are directed toward the hydrogenation of aromatic nuclei, the ring-opening of cyclic hydrocarbons, desulfurization, denitrification, hydrogenation, etc. The catalyst contains 0.01 percent to about 2.0 percent by weight of the noble metal component, and the atomic ratio of lead to noble metal is in the range of 0.05:1 to 0.9:1.

3,607,729

PRODUCTION OF KEROSENE JET FUELS

Robert E. Robinson, and William K. Meerbott, both of Houston, Tex., assignors to Shell Oil Company, New York, N.Y.

Filed Apr. 7, 1969, Ser. No. 814,520
Int. Cl. C10g *13/02*; C07c *5/16*; B01j *11/08*
U.S. Cl. 208—112 9 Claims

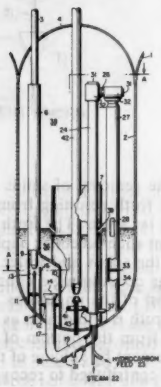
A process for the production of kerosene jet fuels in which kerosene boiling range petroleum fractions are contacted with hydrogen and a catalyst comprising a noble metal and fluoride on alumina, the process being further characterized by control of the kerosene feed water content to a low level (e.g., 10 p.p.m. or lower).

3,607,730

APPARATUS AND METHOD FOR CONVERSION OF HYDROCARBONS

Robert W. Pfeiffer, Bronxville, N.Y., assignor to Pullman Incorporated, Chicago, Ill.

Continuation-in-part of application Ser. No. 719,052, Apr. 5, 1968, Pat. No. 3,492,221. This application Jan. 23, 1970, Ser. No. 5,168
Int. Cl. C10g *13/14*; B01j *9/06*
U.S. Cl. 208—164 25 Claims



An apparatus and method for effecting fluid catalytic cracking of hydrocarbons to products boiling in the gasoline range including a seal well containing a pressure-developing column of regenerated catalyst for transfer of the catalyst through a reaction zone, the seal well being in open pressure communication with the outlet of the reaction zone.

3,607,731

RE-REFINED WASTE CRANKCASE OILS AND METHOD

Graham L. Gulick, Schiller Park, Ill., assignor to Quvoe Chemical Industries, Inc., Schiller Park, Ill.

Filed Apr. 9, 1969, Ser. No. 814,845
Int. Cl. C10m *11/00*
U.S. Cl. 208—181 12 Claims

A method of removing contaminants, including detergents and other additives, dispersed in waste crankcase oil. A treating solution comprising a mixture of (1) compounds furnishing nitrate ions, such as nitric acid, or nitrate salts, and (2) sulfuric acid; in a ratio of about one-half to about two parts by weight of nitrate ion per part by weight of sulfuric acid, is allowed to react with waste crankcase oil, preferably waste crankcase oil which has been previously partially re-refined, in a ratio of from about 0.1 percent to about 2 percent by volume of the treating solution in relation to the volume of waste oil. The mixture may be heated to about 80° C. with thorough agitation. Improved separation is sometimes obtained by adding dimethyl formamide or dimethyl sulfoxide to the reaction mixture.

3,607,732
TREATMENT OF HYDROCARBONS WITH HYDROGEN CHLORIDE GAS AND OXYGEN

Jesse K. Boggs, Houston, Tex., assignor to Esso Research and Engineering Company

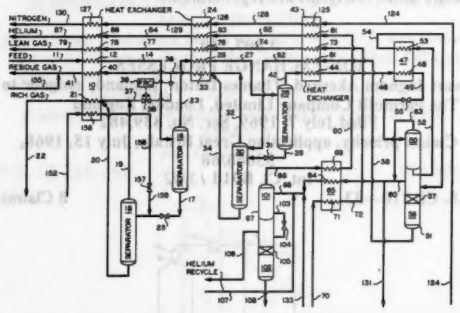
Filed Mar. 19, 1969, Ser. No. 808,411
Int. Cl. C10g *17/02*
U.S. Cl. 208—254 **11 Claims**

Heterocyclic compounds containing nitrogen are removed from hydrocarbon oils by treatment with oxygen (preferably in the form of air) and hydrogen chloride gas. The hydrocarbons may be treated alone, or a solvent may be used which assists in precipitating the complex of heterocyclic compounds formed by the reaction of the present invention. A preliminary heat-treating step makes the compounds even more susceptible to treatment by the present process. The products are worked up by neutralization and distillation or hydrofining. Improved oxidation resistance and color are obtained by the treatment of the present invention.

3,607,733
CONTROLLED EVAPORATION IN HEAT EXCHANGE ZONES

Ernest A. Harper, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Apr. 25, 1969, Ser. No. 819,223
Int. Cl. F25j *3/00, 3/02, 3/06*
U.S. Cl. 208—340 **10 Claims**

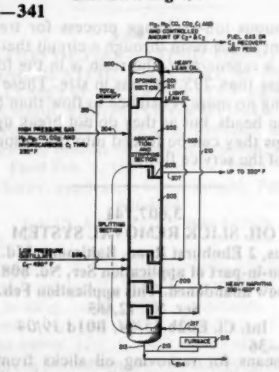


A method for improving the ΔT distribution of a heat exchange zone used in cryogenic separation. The invention comprises refluxing selected hydrocarbon ranges from a rich gas effluent to control the evaporation of the rich gas stream passing through said heat exchange zone.

3,607,734
LIGHT HYDROCARBON ABSORPTION AND FRACTIONATION

Thomas R. Stafford, Sr., Baton Rouge, La., assignor to Esso Research and Engineering Company

Filed Nov. 6, 1969, Ser. No. 874,592
Int. Cl. C10g *5/04*
U.S. Cl. 208—341 **4 Claims**

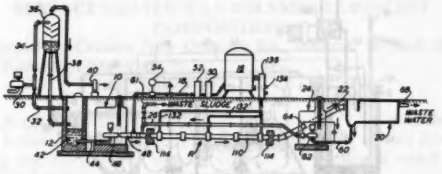


A mixture of gaseous and liquid hydrocarbons are processed in an integrated column in which absorbing, demethanizing (or deethanizing or depropanizing) and splitting operations are combined. Gaseous feed is introduced to the absorber section and liquid feed to the absorber section and/or the splitter section. A light naphtha fraction from the splitter section is used as the primary absorbing medium in the absorber section. Heavy naphtha, also from the splitter section is used as lean oil in a sponge section, primarily to remove light lean oil from absorber section overhead. Absorber fat oil, light naphtha, heavy naphtha, bottoms and fuel gas are or can be produced as products.

3,607,735
SYSTEM FOR TREATMENT OF SECONDARY SEWAGE

Howard K. Hover, Somerville; Derk Th. A. Huibers, Berkeley Heights, and Lawrence J. Serkanic, Jr., North Plainfield, all of N.J., assignors to Air Reduction Company, Incorporated, New York, N.Y.

Filed July 2, 1969, Ser. No. 838,547
Int. Cl. C02c *1/08*
U.S. Cl. 210—7 **21 Claims**

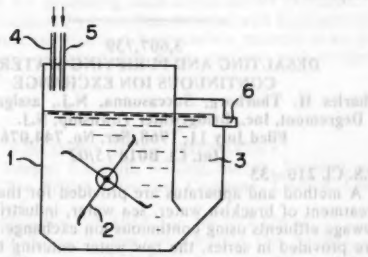


Sewage effluent from a primary treatment plant is initially pumped to a vacuum deaerator for removal of dissolved air and hence nitrogen, from the effluent stream. This stream, deaerated as required, is joined with a stream of recycled activated sludge and a stream of pure oxygen in quantity sufficient to meet the "biological oxygen demand" (BOD) of the combined effluent and recycled activated sludge. The confluence is pumped through an underground pipeline reactor having a static mixer for enhancing contact between the oxygen, aerobic bacteria and organic pollutants. The reactor stream BOD is progressively reduced to the required level at the reactor outlet. A downstream clarifier separates the reactor activated sludge from treated waste water and separated sludge in part is returned for recycling to the inlet of the reactor. The clear waste effluent from the clarifier is sent to tertiary treatment units or to receiving waters.

3,607,736
METHOD OF TREATING ORGANIC WASTE WATER

Miyaji, Yusho, Kanagawa-ken, Japan, assignor to Kurita Water Industries Ltd., Osaka-shi, Japan

Filed Mar. 21, 1969, Ser. No. 809,109
Claims priority, application Japan, Mar. 29, 1968, 43/20070
Int. Cl. C02c *1/14*
U.S. Cl. 210—11 **10 Claims**



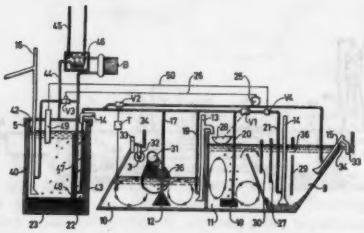
A method of treating organic waste water which comprises the steps of bringing activated sludge consisting mainly of denitrifying bacteria into contact with organic waste water in the presence of nitrate ions or nitrite ions, keeping said waste

water in an anaerobic state and destroying the decomposable organic matters contained in the waste water by virtue of the nitrate respiration of said denitrifying sludge.

3,607,737
METHOD AND APPARATUS FOR THE AEROBIC PURIFICATION OF SEWAGE WATER AT A TEMPERATURE HIGHER THAN THE AMBIENT TEMPERATURE

Sven Gustaf Yngve Gamer, Norrkoping, Sweden, assignor to Stenberg-Flygt AB, Solna, Sweden

Filed Jan. 28, 1969, Ser. No. 794,632
Claims priority, application Sweden, Sept. 18, 1968, 12598/68
Int. Cl. C02c *1/06*
U.S. Cl. 210—12 **3 Claims**



An aerobic method for purification of sewage water taking place at a sludge temperature above the ambient temperature, according to which method sludge is at first sedimented and then passed to a reactor vessel of small size, which vessel is insulated against loss of heat to the surroundings and in which vessel the sludge is subjected to exothermic oxygenation, while retaining the reaction heat generated.

3,607,738
SEWAGE TREATMENT

Donald A. Nelson, Knoxville, Tenn., assignor to Nalco Chemical Company, Chicago, Ill.

Filed Feb. 12, 1969, Ser. No. 798,783
Int. Cl. C02b *1/18*
U.S. Cl. 210—18 **3 Claims**

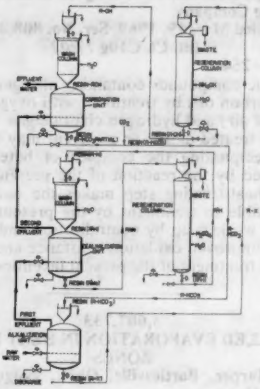
Sewage treatment in which sewage is passed to a tertiary treatment plant from an activated sludge plant, said tertiary treatment including the step of intimately mixing lime and particular polyamines with the effluent from the secondary clarifier. The polyamines catalyze the reduction of phosphate in the sewage by the lime, thereby lowering the quantity of lime required to produce water having a satisfactory phosphate level.

3,607,739
DESALTING AND PURIFYING WATER BY CONTINUOUS ION EXCHANGE

Charles H. Thorborg, Succasunna, N.J., assignor to Gulf Degremont, Inc., Bridgewater Township, N.J.

Filed July 11, 1968, Ser. No. 744,076
Int. Cl. B01d *15/02*
U.S. Cl. 210—33 **9 Claims**

A method and apparatus are provided for the continuous treatment of brackish water, sea water, industrial wastes or sewage effluents using continuous ion exchange. Three units are provided in series, the raw water entering the first unit and the purified water leaving the third unit. While the water moves continuously through the three units, an ion exchange resin is caused to flow countercurrent therethrough, a weak base anion exchange resin in the bicarbonate state passing through the first unit and the same resin, in the free base form, passing through the third unit. Passing through the second unit countercurrent to the effluent is a weak acid ca-

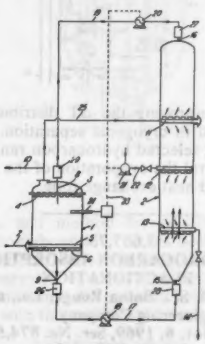


tion exchange resin. After passage through the first and second units, the resins are regenerated.

3,607,740
ION-EXCHANGE PROCESSES

Ewart Ingham Akeroyd, Thames Ditton, England, assignor to The Permutit Company Limited, London, England

Filed July 7, 1969, Ser. No. 839,482
Claims priority, application Great Britain, July 15, 1968, 33666/68
Int. Cl. B01d *15/02*
U.S. Cl. 210—33 **8 Claims**



In a continuous ion-exchange process for treating water with movement of the resin through a circuit that includes an absorber and a regenerator, the resin is in the form of magnetic beads less than 295 microns in size. These beads form beds presenting no more resistance to flow than beds of conventional resin beads, but as they do not break up on passing through pumps they can be forced into the absorber without interruption of the service flows.

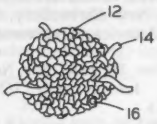
3,607,741
OIL SLICK REMOVAL SYSTEM

Alfred Sohnius, 2 Elmhurst Road, Baltimore, Md.

Continuation-in-part of application Ser. No. 808,023, Mar. 17, 1969, now abandoned. This application Feb. 19, 1970, Ser. No. 12,685
Int. Cl. E02b *15/04*; **B01d** *39/04*
U.S. Cl. 210—36 **10 Claims**

Physical means for removing oil slicks from water and other surfaces utilizing chemically treated cellulosic bulk

material contained in encasements of netting. The chemically treated material is hydrophobic but exhibits an affinity for oil. Oil thus gathered can be reclaimed.



3,607,742

METHOD AND COMPOSITION FOR PHOSPHATE REMOVAL

William C. Steigerwald, Jr., Box 3040, Euclid, Ohio

Filed June 30, 1969, Ser. No. 837,914
Int. Cl. C02b *1/20*
U.S. Cl. 210—47 12 Claims

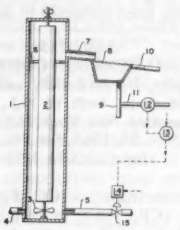
Composition for removing phosphate content of raw sewage and waste comprising a solution of sodium hydroxide, aluminum hydrate, unmodified starch and water. Method of applying such composition.

3,607,743

PROCESS FOR THE SEPARATION OF SOLIDS FROM A SUSPENSION THEREOF IN WATER BY MEANS OF AGGLOMERATION

Pieter Visser; Johannes Boom, and Henricus G. J. Van Noesel, all of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed June 17, 1969, Ser. No. 834,113
Claims priority, application Netherlands, June 18, 1968, 6808575
Int. Cl. B01d *21/01*
U.S. Cl. 210—51 10 Claims



A process is disclosed for the continuous agglomeration of solid particles from a suspension thereof in water by passing the suspension and a binding agent through an agglomeration zone in which a turbulent motion is maintained and adding binding agent to the agglomeration zone at varying rates responsive to the particle concentration of the aqueous stream flowing from the agglomeration zone.

3,607,744

PREPARATION OF FIRE-EXTINGUISHING MATERIAL COMPRISING HEATING A MIXTURE OF UREA AND AN ALKALI METAL BICARBONATE CARBONATE SESQUICARBONATE OR HYDROXIDE

Arnold George Cottrell, Northwich, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 3, 1969, Ser. No. 796,178
Claims priority, application Great Britain, Feb. 26, 1968, 9204/68
Int. Cl. A62d *1/00*; C07c *127/00*
U.S. Cl. 252—7 6 Claims

Improved yields of fire-extinguishing compounds having the empirical formula $MC_2N_2H_5O_3$ where M is Na or K, and made by heating urea with carbonates, bicarbonates, sesquicarbonates or hydroxides of sodium or potassium at temperatures below 150° C., are obtained by having water vapor present in the atmosphere in contact with the reaction system. The preferred proportion of water vapor is 15% to 35% by volume and the preferred reaction temperature 120° C. to 140° C.

3,607,745

AEROSOL FLAME RETARDANT COMPOSITIONS COMPRISING AN ALIPHATIC CHLOROFLUORO HYDROCARBON AND A FLAME RETARDANT

Joseph DiPietro, Alma, Mich., assignor to Michigan Chemical Corporation, Saint Louis, Mich.

Filed Sept. 30, 1968, Ser. No. 776,845
Int. Cl. C09k *3/28*, *3/30*
U.S. Cl. 252—8.1 10 Claims

Aerosol solutions or emulsions useful in treating consumer's goods especially fabrics to render them fire-retardant are formulated for packaging under pressure in a valved container; and comprise a freon-type solvent, a brominated or chlorinated phosphate or phosphite such as tris (2,3-dibromopropyl) phosphate and, if desired, a carrier such as a polyvinyl chloride latex.

3,607,746

SURFACE COATED WAX-POLYMER LUBRICANT COMPOSITIONS

Gerard P. Caruso, New Orleans, La., assignor to Shell Oil Company, New York, N.Y.

Filed Nov. 29, 1968, Ser. No. 780,180
Int. Cl. C10m *5/22*, *5/12*, *5/02*
U.S. Cl. 252—12 6 Claims

Lubricant compositions consisting essentially of free-flowing discrete particles of wax-polymer, the surface of which is coated with a wetting agent and a solid lubricant.

3,607,747

LUBRICANT COMPRISING A NOVEL LUBRICATING IMPROVER OF INORGANIC GRAPHITE FLUORIDE

Toshikatsu Ishikawa, Tokyo, and Tamotsu Hori, No. 28-2, Higashi-Machi, Tojiin, Kita-ku, Kyoto, both of Japan, assignors to Nippon Carbon Company Limited, Tokyo, Japan, by said Hori

Filed May 19, 1969, Ser. No. 825,660
Claims priority, application Japan, May 27, 1968, 43/35,439
Int. Cl. C10m *1/10*
U.S. Cl. 252—18 6 Claims

Lubricants having excellent physical properties are composed of a base oil usually used and a high molecular weight inorganic graphite fluoride having a formula of (CF)n as an improver. Graphite fluoride is produced by reacting carbon or graphite with fluorine, halogen fluoride or a higher fluorine compound at a temperature of lower than 550° C.

3,607,748

SULFUR CONTAINING HYDROCARBON COMPOSITION

Raymond F. Wilson, and Reese A. Peck, both of Fishkill, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 28, 1969, Ser. No. 803,397
Int. Cl. C10m *1/38*
U.S. Cl. 252—48.2 6 Claims

Compositions which exhibit improved oxidation resistance and process for producing such compositions prepared by treating an oxidized hydrocarbon material with hydrogen sulfide. The preferred oxidized hydrocarbon material is an oxidized mineral oil which has been oxidized with oxygen, preferred air.

3,607,749

VISCOSITY INDEX IMPROVERS

Eric Simon Forbes, Knaphill, Woking, Surrey, England, assignor to The British Petroleum Company, Limited, London, England

Filed Nov. 19, 1968, Ser. No. 777,176
Claims priority, application Great Britain, Dec. 5, 1967, 55294/67
Int. Cl. C10m *1/28*
U.S. Cl. 252—56 4 Claims

Viscosity Index improvers for lubricating oils comprise a polymer of molecular weight above 100,000 e.g. a

polymethacrylate, and a polymer of molecular weight below 25,000 e.g. a polyisobutylene. The low molecular weight polymer increases the shear-stability of high molecular weight polymer.

3,607,750

METAL COATED METAL CARRIER PARTICLES FOR ELECTROSTATIC DEVELOPERS

Kenneth W. Rarey, South Holland; John B. Kennedy, Jr., Chicago, and Marion J. Ziminkowski, Chicago, all of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Aug. 12, 1968, Ser. No. 752,081
Int. Cl. G03g *9/02*
U.S. Cl. 252—62.1 **4 Claims**

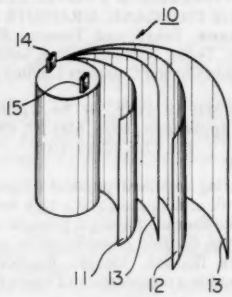
In an electrostatic printing process employing a developer mixture comprised of electrically conductive carrier particles and electrostatically attractable toner particles, the effect of humidity of the air on the electrical conductivity of the carrier particles is substantially reduced by coating the carrier particles with a thin surface coating of a metal of the platinum group of the metals of Group VIII of the Periodic Table of Elements.

3,607,751

ELECTROLYTIC CAPACITOR

Susumu Yoshimura, Kadoma, Japan, assignor to Matsushita Electric Industrial Company, Limited, Osaka, Japan

Filed June 24, 1969, Ser. No. 835,927
Claims priority, application Japan, July 2, 1968, Sept. 19, 1968, Sept. 19, 1968, 43-46684;43-68993;43-68994
Int. Cl. H01g *9/02*
U.S. Cl. 252—62.2 **1 Claim**



An electrolytic capacitor having a metal electrode with a dielectric film thereon and an electrolyte which is composed of an organic acid, substances such as p-quinone and manganese dioxide as an ionization substance and highly dielectric solvents such as dimethyl formamide and polyhydric alcohol.

A good conductivity and a large film recovery capability are achieved with this composition electrolyte.

3,607,752

PROCESS FOR THE CULTURE OF LARGE MONOCRYSTALS OF LITHIUM NIOBATE

Heini Graenicher, Erlenbach/ZH, Switzerland, assignor to Ciba Limited, Basel, Switzerland

Continuation-in-part of application Ser. No. 692,622, Dec. 1, 1967, now abandoned. This application June 30, 1970, Ser. No. 51,140
Int. Cl. B01j *17/20;* **C01d** *11/00*
U.S. Cl. 252—62.9 **8 Claims**

The present invention relates to a process for cultivating larger unstressed single-domain crystals containing niobium and an alkali metal, preferably lithium. The process is conducted by the Zochralski technique for cultivating crystals from a melt in an oxidizing moist atmosphere by means of resistance heating, which maintains an electric short circuit between crystal seed and the melt.

3,607,753

METHOD OF MAKING LITHIUM FERRITE POWDERS

Lydia A. Suchoff, New Shrewsbury, N.J., assignor to The United States of America as represented by the Secretary of the Army

Filed Nov. 16, 1967, Ser. No. 684,603
Int. Cl. C04b *35/26*
U.S. Cl. 252—62.61 **6 Claims**

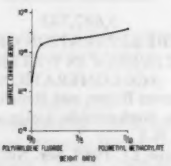
Ceramic powders of uniform and fine particle size are made by freeze drying a liquid solution of ceramic forming metallic salts, subliming the solvent, and applying heat to decompose the remaining solute to a ceramic powder.

3,607,754

HIGH MOLECULAR WEIGHT ELECTRETS AND PROCESS FOR PRODUCING THEM

Mitsuo Asahina; Haruko Kakutani; Kinuko Wada, and Masahiko Tamura, all of Tokyo, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan and Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 9, 1969, Ser. No. 883,494
Claims priority, application Japan, Dec. 9, 1968, 43/89522
Int. Cl. H01b *3/18*
U.S. Cl. 252—63.2 **6 Claims**



An electret comprising a resin mixture of from 50 to 90 percent by weight of a vinylidene fluoride resin and from 10 to 50 percent by weight of a methyl methacrylate resin, said resin mixture having been subjected to polarization.

3,607,755

NOVEL HALOCARBON COMPOSITIONS

Kevin Paul Murphy, Bernardsville, and Richard Frederick Harry Stahl, Madison, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Nov. 25, 1968, Ser. No. 778,759
Int. Cl. C09k *3/02*
U.S. Cl. 252—67 **8 Claims**

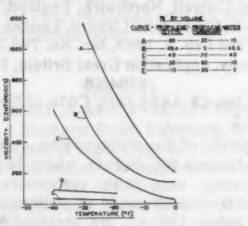
Dichlorodifluoromethane (CCl_2F_2) and 1,1,1,2-tetrafluoroethane (CF_3CH_2F), in certain proportions, form an azeotrope and essentially azeotropic mixtures, which are constant boiling, or essentially constant boiling, and which mixtures possess refrigeration capacities higher than either of the CCl_2F_2 and CF_3CH_2F components alone. These mixtures are especially adapted for use in systems having high-condensing temperatures such as automobile air conditioning systems.

3,607,756

HEAT TRANSFER LIQUID AND USE

Wendell F. Phillips, Moorestown, N.J., assignor to Campbell Soup Company, Camden, N.J.

Filed Mar. 22, 1968, Ser. No. 715,419
Int. Cl. C09k *3/00, 3/18*
U.S. Cl. 252—73 **15 Claims**



A liquid composition, having a freezing point well below the freezing point of water and adapted for use as a liquid

heat transfer composition at low temperatures, is provided which consists essentially of propylene glycol, propylene carbonate and water, in defined proportions. Typical advantageous uses for the composition include use as a defrosting and as a coolant (including freezing) liquid.

3,607,757
CORROSION RESISTANT ANTIFREEZE COMPOSITIONS

Harold McDonald, Harrington Park, N.J., assignor to Stauffer Chemical Company, New York, N.Y.

Filed July 24, 1968, Ser. No. 747,093
Int. Cl. C09k *3/02*; **C23f** *11/16*
U.S. Cl. 252—75 **12 Claims**

Corrosion resistant antifreeze compositions consisting essentially of at least one antifreeze fluid having from 1 to 4 carbons inclusive and from 1 to 3 hydroxy groups inclusive and a minor but effective amount sufficient to inhibit corrosion of an alkali metal dialkyl phosphate. The alkali metal dialkyl phosphate can be represented by the formula:

wherein R is an alkyl group containing from about 8 to about 16 carbon atoms inclusive, and M is an alkali metal ion.

3,607,758
FUNCTIONAL FLUID COMPOSITIONS

Frank H. Langenfeld, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of application Ser. No. 682,546, Nov. 13, 1967, now Patent No. 3,513,097, which is a continuation-in-part of application Ser. No. 516,077, Dec. 23, 1965, now abandoned. This application Mar. 17, 1970, Ser. No. 20,395
Int. Cl. C09k *3/00*; **C10m** *3/38*; **C23f** *11/08*
U.S. Cl. 252—78 **7 Claims**

Compositions comprising amide of an acid of phosphorus and a small amount of water exhibit the ability to inhibit and control damage to mechanical members in contact with said compositions. The compositions have many uses, among which are their use as hydraulic fluids.

3,607,759
DENTURE SOAK TABLET

Jordan B. Barth, East Brunswick, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 17, 1969, Ser. No. 817,199
Int. Cl. C11d *7/54*
U.S. Cl. 252—100 **8 Claims**

This disclosure relates to the process of preparing a water-soluble effervescent denture soak tablet free of capping or picking tendencies, which comprises the thorough blending of the water-soluble ingredients including a carbonate, organic acid and at least one oxidizing agent, the terminal addition and blending of a water-soluble detergent to the above formulation, subjecting the homogenous mixture to normal pressures in a tableting device, yielding tablets with clean surfaces and sharp edges. The terminal addition of the water-soluble detergent to the formulation lubricates the dies and permits easy and clean ejection of the tablet.

3,607,760
CLEANING COMPOSITION FOR PET STAINS

Edna M. McIntyre, 17280 E. 11th, Tulsa, Okla.

Filed June 9, 1969, Ser. No. 831,700
Int. Cl. C11d *7/54*
U.S. Cl. 252—104 **7 Claims**

A composition for removing pet stains from carpets and the like comprising 10 to 14 parts by weight of butyl cellosolve, 5 to 15 parts of isopropyl alcohol (or ethyl alcohol), about one to three parts of a 3.5 percent solution of hydrogen peroxide, about one-quarter to two parts of ethylene diamine tetracetic acid and 103 parts of water.

3,607,761
SOAP BARS CONTAINING SALTS OF FATTY ACIDS DERIVED FROM THE GUERBET REACTION

George C. Feighner, Franklin Lakes, N.J., and William L. Groves, Jr., Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Dec. 9, 1968, Ser. No. 782,416
Int. Cl. C11d *9/00, 9/18, 17/00*
U.S. Cl. 252—108 **5 Claims**

A detergent bar comprising an alkali metal salt or a blended magnesium-alkali metal salt of blends of C_{12} to C_{16} acids derived from the oxidation of alcohols produced by the Guerbet reaction and an alkali metal soap or a blended magnesium-alkali metal soap of a C_{16}–C_{18} fatty acid.

3,607,762
SOAP COMPOSITIONS CONTAINING VICINAL HYDROXYALKYL MALEATES

Roger L. Kidwell, Kirkwood, and John H. Payne, Saint Louis, both of Mo., assignors to Monsanto Company, Saint Louis, Mo.

Filed July 1, 1969, Ser. No. 838,331
Int. Cl. C11d *9/26*
U.S. Cl. 252—132 **4 Claims**

The tendency of natural soap compositions to deposit precipitates in hard water is inhibited by addition of 12–25 percent by weight sodium or potassium vicinal hydroxy alkyl maleate wherein the alkyl group contains from 12 to 20 carbon atoms.

3,607,763
PROCESS FOR THE PREPARATION OF LAUNDERING COMPOSITIONS

Leo A. Salmen, Union City; Marvin Liebowitz, Edison, and Jerome Stanley Schrager, Cedar Grove, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of application Ser. No. 587,364, Sept. 26, 1966, now abandoned. This application Dec. 5, 1969, Ser. No. 878,989
Int. Cl. C11d *1/62, 1/86, 3/06*
U.S. Cl. 252—137 **10 Claims**

A process for the preparation of a spray-dried, built, detergent-softener composition containing an ethoxylated nonionic detergent in combination with a di-higher alkyl quaternary ammonium textile softener is described which comprises the steps of (1) admixing the softener, nonionic detergent, and water to form an aqueous mixture containing a homogeneous dispersion of the softener; (2) incorporating an inorganic sodium or potassium phosphate builder in the aqueous mixture of step 1 to form a mixture containing more than 50 percent solids by weight, the temperature of the mixture being at least about 180° F. at the time the phosphate is introduced therein, and (3) spray drying the mixture of step 2.

3,607,764
GLASS WASHING COMPOUND AND PROCESS

Homer E. Crotty, and Michael T. Zalzal, both of Cincinnati, Ohio, assignors to W. R. Grace & Co., New York, N.Y.

Filed Jan. 31, 1968, Ser. No. 701,829
Int. Cl. C11d *3/075*
U.S. Cl. 252—139 **4 Claims**

Glassware is washed with an aqueous solution of a washing compound comprising from 25 to 75 parts alkali metal hydroxide, 5 to 25 parts alkali metal tripolyphosphate, 5 to 25 parts tetra-alkali metal pyrophosphate, 5 to 25 parts of a hydroxy carboxylic acid sequesterant, from 5 to 20 parts of a glycol ether, from 0.2 to 10 parts of a nonionic polyalkoxylated surfactant, and from 0 to 25 parts of sodium carbonate. By this process, all types of typical soils found on laboratory

glassware as well as permanent marking inks used in the pharmaceutical industry are removed.

3,607,765
DETERGENT SOFTENER COMPOSITIONS
Harold Eugene Wixon, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Nov. 29, 1968, Ser. No. 780,173
Int. Cl. C11d *1/18, 1/38, 1/50, 3/26, 7/32*
U.S. Cl. 252—152 **5 Claims**

A detergent composition which also softens textiles and which is nonyellowing and further does not render the textile water repellent, comprising a surface active detergent component and an imidazoline oxide compound.

3,607,766
COMBINATION SOAP AND HYDROGENATED OLEFIN SULFONATE DETERGENT BARS
Gar Lok Woo, Tiburon, and William Alan Sweeney, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.
Continuation-in-part of application Ser. No. 748,188, July 29, 1968. This application Aug. 11, 1969, Ser. No. 849,207
Int. Cl. C11d *1/12*
U.S. Cl. 252—161 **5 Claims**

Soap and detergent bars prepared from a major proportion of soap and a minor proportion of hydrogenated olefin sulfonate containing from 10 to 24 carbon atoms in an amount sufficient to retain in suspension insoluble lime soaps resulting from use in hard water.

3,607,767
AZEOTHROPIC COMPOSITION OF 1,1,2-TRIFLUOROETHANE, METHYLENE CHLORIDE, AND CYCLOPENTANE
John Allan Schofield, Irvington, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
Continuation-in-part of application Ser. No. 661,807, Aug. 21, 1967, now abandoned. This application Oct. 10, 1969, Ser. No. 865,525
Int. Cl. C09d *9/00;* **C11d** *7/50;* **C23g** *5/02*
U.S. Cl. 252—171 **2 Claims**

It is not intended that the following abstract of the disclosure be construed as limiting the invention in any manner.

The disclosure relates to azeotropic mixtures of trichlorotrifluoroethane, methylene chloride and cyclopentane. The azeotropes are useful in solvent cleaning applications.

3,607,768
AZEOTROPIC COMPOSITION
Jan R. Haase, Rochester, and John A. Schofield, Irvington, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.
Continuation-in-part of application Ser. No. 590,204, Oct. 28, 1966, now abandoned. This application Nov. 17, 1969, Ser. No. 877,441
Int. Cl. C09d *9/00;* **C11d** *7/50;* **C23g** *5/02*
U.S. Cl. 252—171 **2 Claims**

Azeotropes are formed between 1,1-dichloroethane and 1,1,2-trichloro-1,2,2-trifluoroethane which boils at about 115.5° F. at 760 mm. mercury pressure. The azeotrope is useful in solvent degreasing applications.

3,607,769
BORE CLEANER
Charles E. Page, 1016 Hancock St., Piqua, Ohio
Filed Dec. 18, 1969, Ser. No. 886,404
Int. Cl. C09d *9/04;* **C11d** *7/52;* **C23g** *5/02*
U.S. Cl. 252—171 **6 Claims**

A composition, useful for removal of residues from gun barrels deposited during firing, consisting essentially of from 5 to 15 percent by volume of N,N-dimethyl formamide, from 40 to 50 percent by volume of ethylene glycol, and remainder substantially distilled water. Preferably, up to 0.1 percent by volume of a nonionic wetting agent, and a trace of a water soluble dye, are included.

3,607,770
GASEOUS REACTION PROCESS FOR THE PRODUCTION OF RARE EARTH OXYHALIDE AND OXIDE LUMINESCENT MATERIALS
Jacob G. Rabatin, Chardon, Ohio, assignor to General Electric Company
Filed Oct. 23, 1968, Ser. No. 780,928
Int. Cl. C09r *1/08;* **C22b** *59/00;* **C01f** *17/00*
U.S. Cl. 252—301.4 R **12 Claims**

A method for the production of well-formed crystals of oxyhalides including oxychlorides, oxybromides, and oxyiodides, and oxides, of yttrium and the rare earth metals, i.e., elements having atomic numbers 39 and 57 through 71. Particles of the oxide of the selected element are heated in an atmosphere containing enough of the selected hydrogen halide to cause conversion of the oxide to the oxyhalide and recrystallization of the oxyhalide. This recrystallized oxyhalide can be converted to the corresponding oxide as large, well-crystallized particles by pyrohydrolysis. Alternatively, the oxyhalide can be formed by initially firing the oxide particles as a mixture with the selected ammonium halide. By starting with rare earth activated oxides, the process of the invention produces luminescent materials which are useful for cathode-ray tube applications, in lamps, and in X-ray applications such as in image converter tubes and film intensifier screens.

3,607,771
RARE EARTH-ACTIVATED SILVER AND COPPER-SENSITIZED ZINC AND CADMIUM SULFIDE PHOSPHORS
Jerome S. Prener, and Jack D. Kingsley, both of Schenectady, N.Y., assignors to General Electric Company
Continuation of application Ser. No. 518,311, Jan. 3, 1966, now abandoned. This application Dec. 6, 1968, Ser. No. 785,019
Int. Cl. C09k *1/12*
U.S. Cl. 252—301.4 **2 Claims**

Phosphors exhibiting very narrow wavelength bands of high-intensity emission are composed of a chalcogenide host and activated with a rare earth and a noble metal. Zinc sulfide activated with erbium and sensitized with silver is an example of the phosphors.

3,607,772
INFRARED SENSITIVE ZINC SULFIDE LUMINOPHORE
Otto R. Kozak, Long Beach, N.Y., assignor to I. R. Research, Palo Alto, Calif.
Filed Dec. 11, 1968, Ser. No. 783,153
Int. Cl. C09k *1/12;* **G01j** *1/58*
U.S. Cl. 252—301.6S **2 Claims**

A luminophore that is extremely sensitive to both low intensities and very long wavelengths of infrared radiation is described. The luminophore consists of very high purity zinc sulfide crystals that are sensitized to infrared radiation by adding minute quantities of the elements lead, cobalt and praseodymium thereto. The lead, cobalt and praseodymium-activated zinc sulfide crystals, when prepared in a suitable emulsion film, will detect infrared radiation having energies as low as 10^{12} electron volts and of wavelengths as long as 15 microns. When first "sensitized" by ultraviolet light and subsequent illumination by infrared radiation, the luminophores of the invention luminesce, generally within the visible red range of the spectrum, with color gradations all the way out to the blue, depending upon the intensity of infrared radiation received.

3,607,773
EMULSIFYING WATER AND AIRBLOWN ASPHALT WITH TALL OIL AND TRIETHANOLAMINE
Armin C. Pitchford, and Gene N. Woodruff, both of Bartlesville, Okla., assignors to Phillips Petroleum Company
Filed Sept. 26, 1968, Ser. No. 762,991
Int. Cl. B01j *13/00*
U.S. Cl. 252—311.5 **7 Claims**

Airblown asphalt and water are hard to emulsify with either tall oil or triethanolamine as the emulsifying agent. The use of both tall oil and triethanolamine gives a synergistic effect, and weight percents based on the total weight of

the emulsion of 0.9 tall oil and 0.7 triethanolamine produced stable emulsions while 1.6 of either one alone failed to produce an emulsion. Alkali metal hydroxide to adjust the pH above 7 and known emulsion stabilizing agents may be added.

3,607,774
PRODUCTION OF SILICA SOLS
William Cummings, Marford, Flintshire, Wales, England, assignor to Monsanto Chemicals Limited, London, England
Filed July 30, 1969, Ser. No. 846,232
Claims priority, application Great Britain, Aug. 8, 1968, 37,837/68
Int. Cl. C01b *33/14*
U.S. Cl. 252—313 S 7 Claims

This invention relates to a process for producing aquasols and products thereof in which the silica particles have a dissymmetry diameter greater than 500 A. which involves adding aqueous silicic acid having a pH less than 7 to a heated vessel containing a heel, an aqueous alkali metal silicate (i.e., sodium silica) solution having an initial concentration expressed as SiO_2 of from about 2.5 percent to 10 percent by weight with the quantity of aqueous silicic acid added being such that the molar ratio of SiO_2 added as silicic acid to M_2O content of the alkali metal silicate in the heel (where M is an alkali metal atom) is at least 25:1.

3,607,775
PROCESS FOR ENCAPSULATING MINUTE PARTICLES BY USE OF AUTOGENOUSLY POLYMERIZABLE CAPSULE WALL MATERIAL
Noble Hauime Yoshida, Kettering, and Robert Erwin Miller, Dayton, both of Ohio, assignors to The National Cash Register Company, Dayton, Ohio
Filed Jan. 29, 1968, Ser. No. 701,125
Int. Cl. B01j *13/02;* B44d *1/02, 1/44*
U.S. Cl. 252—316 9 Claims

A method is provided for producing, en masse, in a liquid manufacturing vehicle, minute capsules having walls which comprise a complex of at least two polymeric materials originally having opposite net electrical charges, at least one of which polymeric materials additionally is autogenously polymerizable to a solid polymeric material insoluble in the manufacturing vehicle. In the process, a liquid-liquid phase separation is effected by complex coacervation that is brought about by the opposite charges on the charged polymeric materials while in solution, and the complexly combined materials thereby emerge from solution in the manufacturing vehicle as a liquid phase relatively rich in the polymeric materials. The emergent liquid phase wets and enwraps particles of intended capsule core entities which have been dispersed in the manufacturing vehicle to form liquid-walled capsules and then conditions in the manufacturing vehicle are altered to cause the autogenously polymerizable material to react and produce solid, water-insoluble, capsule walls.

3,607,776
MANUFACTURE OF INGESTIBLE CAPSULES
John E. Santo, West New York, and Philip G. Abend, Teaneck, both of N.J., assignors to Pennwalt Corporation
Filed June 11, 1968, Ser. No. 736,017
Int. Cl. B01j *13/02;* B44d *1/02*
U.S. Cl. 252—316 13 Claims

In encapsulation by interfacial polycondensation between intermediates respectively incorporated in minute droplets of one liquid and in a surrounding, continuous phase of another, immiscible liquid, safely ingestible microcapsules, as for containing substances to be used in or with foods, pharmaceuticals and the like, are prepared by such reaction between an intermediate comprising an amino acid, i.e. an amino carboxylic acid having at least two amine groups capable of the condensation reaction, and a suitable complementary intermediate such as a diacid chloride, e.g. adipoyl chloride, yielding a capsule wall of basically polyamide structure, which may also include anhydride linkages.

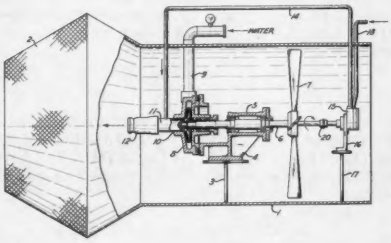
3,607,777
PROCESS FOR PREPARING MICROSPHEROIDAL DESICCANT SILICA GEL
Milton E. Winyall, Ellicott, and Ellsworth G. Acker, Baltimore, both of Md., assignors to W. R. Grace & Co., New York, N.Y.
Filed June 18, 1968, Ser. No. 737,816
Int. Cl. B01j *13/00;* C01b *33/16;* C09k *3/00*
U.S. Cl. 252—317 4 Claims

An aqueous alkali metal silicate solution is partially neutralized with a mineral acid until a pH of about 9.6–10.9 is reached. When a soft gel has formed, the mixture is vigorously agitated to obtain a fine slurry, and more mineral acid is added until a pH of about 0.5–3.0 is reached. The resultant slurry is then spray dried and washed. After drying at about 200° C., product particles of desiccant silica gel having average particle sizes ranging from 10 to 100 microns, a surface area of about 650–950 $m.^2/g.$, and a pore volume of 0.35–0.8 cc./g. are obtained.

3,607,778
ANIONIC SURFACE-ACTIVE AGENTS FROM EPOXYALKANES AND METHOD FOR THEIR PRODUCTION
Robert M. Lincoln, Moylan, and Joseph A. Meyers, III, Springfield, both of Pa., assignors to Atlantic Richfield Company, Philadelphia, Pa.
Filed June 25, 1968, Ser. No. 739,612
Int. Cl. B01f *17/04;* C11d *1/16*
U.S. Cl. 252—353 3 Claims

Random epoxyalkanes in the C_{11}–C_{20} range are reacted with ethylene glycol to produce a hydroxy ether having a primary alcohol group, which reaction product is sulfated to produce an anionic surface active agent.

3,607,779
FOAM GENERATOR
Earle C. King, Evans City, and Walter Milich, Renfrew, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.
Filed Aug. 7, 1969, Ser. No. 848,215
Int. Cl. B01d; B01f; B02j *13/00*
U.S. Cl. 252—359 E 5 Claims

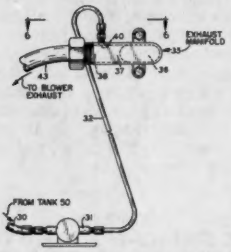


A tubular housing with a rear inlet and a front-end outlet has a foraminous cover over its front end. A shaft extends lengthwise of the inside of the housing and is rotatably supported. It is driven by a water turbine on its front end, the turbine having an inlet for water under pressure and a central front outlet that delivers the water to a forwardly directed nozzle connected to the turbine. Rigidly mounted on the shaft behind the turbine is a fan for blowing air through the housing from back to front. Also mounted on the shaft is a pump for delivering foaming solution to the rear end of the nozzle to mix with the water from the turbine outlet.

3,607,780
NONLETHAL THERMAL-AEROSOL GENERATOR WEAPON

Forrest G. Scott, P.O. Box 246, Auburn, Ind.

Filed Oct. 28, 1968, Ser. No. 771,154
Int. Cl. B01d ; B01f ; B01j 13/00; A01m 19/00
U.S. Cl. 252—359 A 5 Claims



A weapon for producing a nonlethal, voluminous fog of tear gas or riot control agents or material for controlling one or more persons is provided with a two-cycle internal combustion engine that drives an air blower. A manifold is connected to the engine exhaust to cause the exhaust gases to turn at least 90°, and pass through a pipe to be discharged in the outlet opening of the blower. The liquid to be produced as a fog is drawn or injected into the manifold, and is vaporized by the hot exhaust gases. This vapor is discharged or drawn from the pipe by the air blown by the blower and further atomized to efficiently produce a dense, voluminous fog containing air, the vaporized and atomized liquid material, and the engine exhaust gases.

3,607,781
CORROSION INHIBITOR FOR HYDROCHLORIC ACID PICKLING OF STEEL

Thomas M. Kaneko, Trenton; Irving R. Schmolka, Grosse Ile, and John W. Compton, Grosse Ile, all of Mich., assignors to Wyandotte Chemicals Corporation, Wyandotte, Mich.

Filed Jan. 15, 1968, Ser. No. 697,631
Int. Cl. C23f 11/04, 11/12
U.S. Cl. 252—389 10 Claims

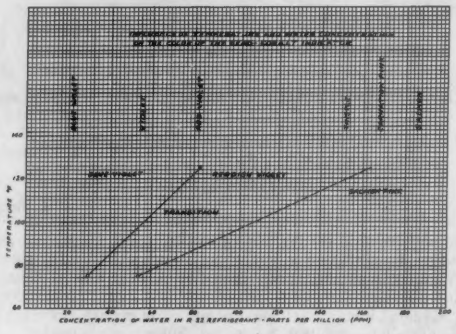
A corrosion inhibitor composition for addition to aqueous solutions normally corrosive to metal surfaces is prepared by dissolving a surface active agent and an amine in a mixture of mineral acids.

3,607,782
MOISTURE CONTENT INDICATOR FOR REFRIGERATION SYSTEMS CONTAINING COBALT-SUBSTITUTED SULFONIC ACID CATION EXCHANGER

Shelvin Rosen, Murraysville, Pa., assignor to Emerson Electric Co.

Filed July 30, 1968, Ser. No. 748,777
Int. Cl. C08g 33/20; G01n 31/22
U.S. Cl. 252—408 13 Claims

Cobalt-substituted sulfonic acid cation exchangers, the functional part of which is the sulfonic acid moiety which is uniformly distributed and supported on an organic base or matrix. The sulfonic acid cation exchangers may be polymers of the polyvinyl aryl type and particularly cobalt-substituted sulfonated polystyrene divinylbenzene copolymer type ion exchange resins which are used as moisture indicators by providing readily detectable color changes with increase and decrease of ambient moisture content. In particular, they can give readily detectable color changes in ambients with as low as a few parts per million of moisture. Different percentages of cobalt substitution may be used, the lower proportions of cobalt being more sensitive in the minimal moisture ranges. The material may be used loose or may be bonded into a separate matrix with some inert material by use of an appropriate binder such as an epoxy resin. The invention is especially applicable to detecting moisture in halogenated



refrigerants in closed refrigeration systems in either liquid or vapor phases. It may also be used in other ambients having limited water solubility.

3,607,783
SOLUTION FOR PRESERVING MICROSCOPIC CORPUSCLES

Antonio Tata, Via Valpolicella 39, and Glauco Torlontano, Via Nicolo Piccinni 32, both of Rome, Italy

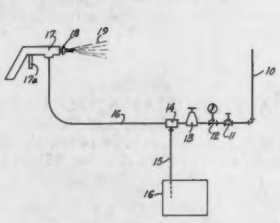
Filed Nov. 6, 1968, Ser. No. 773,949
Claims priority, application Italy, Nov. 8, 1967, 40552A/67
Int. Cl. G01n 31/08, 33/16
U.S. Cl. 252—408 10 Claims

Organic corpuscles are purified by forming a dilute suspension of the corpuscles in an aqueous solution containing (a) 0.1–3.0 percent of a halogen salt of a strong base and a strong acid, (b) 0.2–15.0 percent by weight of a salt of a strong base and a strong acid selected from phosphates and sulphates, and (c) 10–400 mg. per 1,000 ml. of solution of a weak organic acid such as acetic acid, wherein the aqueous solution has a pH of 1–4.5.

3,607,784
METHOD OF REMOVING EXCESS PENETRANT FROM THE SURFACE OF A WORKPIECE

Adolf Mlot-Fijalkowski, Elmwood Park, Ill., assignor to Magnaflux Corporation, Chicago, Ill.

Filed Feb. 18, 1969, Ser. No. 800,097
Int. Cl. C09k 1/02; G01n 21/16, 21/38
U.S. Cl. 252—408 19 Claims



A liquid remover composition for the removal of a film of excess liquid penetrant from the surface of a workpiece undergoing inspection for surface discontinuities. The remover composition is a two-phase liquid in which the continuous phase is water and dispersed phase is a liquid immiscible with water but miscible with the liquid penetrant, and is present in an amount from about 0.2 percent to 10 percent by weight, or higher, of the remover composition. The dispersed phase is in very finely divided form suspended in the water when

pplied with vigorous turbulence against the film of excess enetrant to be removed. Preferably, the dispersed phase quid is of a substantially different density from water so that :paration can be easily effected, after removal of the enetrant from the surface, between the water and the ad- ixed penetrant and dispersed phase liquid so as to facilitate :parate use or disposal thereof without pollution problems.

3,607,785

POLYMERIZATION CATALYSTS, THEIR MANUFACTURE AND USE FOR POLYMERIZING CYCLIC ETHERS

asch Osgan, Paris; Robert Charpentier, Epinay, Seine, and Philippe Teyssie, Vesinet, all of France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil Malmaison, (Hauts de Seine), France

Filed Nov. 21, 1968, Ser. No. 777,893

laims priority, application France, Nov. 21, 1967, 129,123

Int. Cl. C08g *23/14*

S. Cl. 252—431 C **9 Claims**

A process for manufacturing an improved catalyst com- sing reacting an aluminum compound with a zinc com- und and contacting the resultant catalyst with a primary al- hol of the general formula $R'\text{-}CH_2\text{-}OH$, wherein R′ is a drocarbon monovalent radical containing from 1 to 20 car- n atoms.

3,607,786

PRODUCTION OF A CONCENTRATED AQUEOUS COBALT SALT SOLUTION

ns Nienburg, Ludwigshafen; Karl Eichner, Munich; Peter Tavs, Ludwigshafen, and Horst Kerber, Mannheim, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen, Rhein, Germany

Filed Dec. 5, 1968, Ser. No. 781,636

aims priority, application Germany, Dec. 7, 1967, P 16 42 944.0

Int. Cl. C07c *45/02*

. Cl. 252—431 **6 Claims**

A process for the production of an aqueous solution of alt salts of aliphatic carboxylic acids having from two to 1t carbon atoms which contains from 3 to 8 percent by ght of cobalt and is suitable as a catalyst solution for the synthesis, in which process an aqueous solution of cobalt s obtained by treating an oxo reaction mixture with oxi- ts in an aqueous acid medium at elevated temperature separation of the aqueous solution and containing from to 1.5 percent by weight of cobalt is treated with from to 3 percent by weight, with reference to the aqueous alt salt solution to be treated, of a noble metal from ip VIII of the Periodic System in the presence of an unt equivalent to the amount of cobalt contained in the eous solution of an aliphatic carboxylic acid having from to eight carbon atoms, and subsequent concentration by llation.

3,607,787

.VER-CONTAINING MATERIAL AND ELECTRODES AND PROCESSES

garete Jung, Nieder-Escbach; Harald Becker, Frankrt am Main, and Hans von Doehren, Frankfurt am Main, of Germany, assignors to Varta Aktiengesellschaft, ankfurt am Main, Germany

ion of Ser. No. 579,408, Sept. 14, 1966, Pat. No. 3,479,276. Filed Nov. 12, 1969, Ser. No. 870,260

Int. Cl. B01j *11/08, 11/22*

Cl. 252—474 **3 Claims**

method for the preparation of catalytically active par- ate material which includes sorbing hydrogen into the cles of hydrogen-sorbing metallic material, treating the cles with an ionic silver solution, reducing the silver to netallic state and depositing it onto the particles.

3,607,788

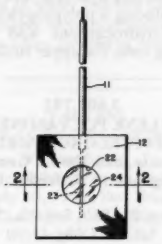
LIQUID ELECTRODE MATERIAL

Robert J. Adolph, 7933 Glen Orchard Drive, and Aribert H. Bernstein, 6127 Graceland Ave., both of Cincinnati, Ohio

Filed Nov. 20, 1967, Ser. No. 687,955

Int. Cl. H01b *1/06;* **A61n** *1/18*

U.S. Cl. 252—510 **3 Claims**



A novel electrode material for use with medical diagnostic potentiometric devices having a wire lead extending therefrom to be secured to the skin of a patient, is provided. The electrode material is a viscous, adhesive, electrically conductive liquid which dries on the skin. Upon application the electrode material will envelope the wire lead, and after drying will assure that dependable and durable electrical contact between skin and wire lead has been made.

3,607,789

ELECTROCONDUCTIVE GLAZE AND METHOD FOR PREPARATION

Gunciappa Krishna Murthy, and Raymond H. Caley, both of Toronto, Ontario, Canada, assignors to Precision Electronic Components Ltd., Toronto, Ontario, Canada

Filed May 2, 1968, Ser. No. 726,198

Int. Cl. H01b *1/06;* **C03c** *3/12*

U.S. Cl. 252—514 **16 Claims**

An electroconductive glaze and process for formation thereof. The glaze comprises a particulate dispersion of conductive metals and/or metal oxides in a germanate glass matrix. The glaze is preferably formed by firing a paste comprising an intimate admixture of the particulate component with a crystallized, finely ground, lead germanate-based glass.

3,607,790

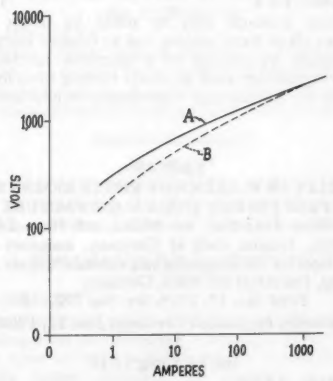
RESISTANCE MATERIAL AND METHOD OF MAKING

John J. Pitha, Lenox, Mass., assignor to General Electric Company

Filed Dec. 5, 1968, Ser. No. 781,473

Int. Cl. H01b *1/04;* **C04b** *35/14*

U.S. Cl. 252—516 **9 Claims**



Lightning-arrester resistance material is composed of silicon carbide particles and a binder therefor composed of cordierite formed of a fired mixture of cordierite-forming glass material and cordierite-forming crystalline material.

3,607,791

METHOD FOR REMOVING HYDROCARBONS

Francis J. Shell, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Dec. 10, 1969, Ser. No. 883,988
Int. Cl. E02b *15/04*
U.S. Cl. 431—2 8 Claims

A method for removing hydrocarbons from the surface of a body of water by placing a polypropylene sheet over and in contact with the hydrocarbons and combusting those hydrocarbons passing onto the upper surface of the sheet.

3,607,792

POLYOXYALKYLENE POLYAMINE VULCANIZING AGENTS FOR EPICHLOROHYDRIN POLYMERS

George Phillip Speranza, and Harold George Waddill, both of Austin, Tex., assignors to Jefferson Chemical Company, Inc., Houston, Tex.

Filed Jan. 2, 1969, Ser. No. 788,635
Int. Cl. C08g *43/00*
U.S. Cl. 260—2 A 16 Claims

Polyoxypropylene polyamines are vulcanizing agents for halogen-containing polymers such as polyepichlorohydrin. The cured polymers are useful specialty rubbers which are resistant to ozone attack.

3,607,793

PROCESS FOR FORMING POROUS STRUCTURES

Bert H. Mahlman, West Chester, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed Feb. 23, 1968, Ser. No. 707,488
Int. Cl. C08f *3/08, 47/08, 45/28*
U.S. Cl. 260—2.5 M 4 Claims

An improved method is taught for preparing porous structures from olefin polymers by heating a dispersion of such polymers in a hydrocarbon liquid to a temperature above the solution temperature, cooling slowly to form a gel and extracting the hydrocarbon liquid. The improvement resides in employing, as a starting material a polymer in the form of particles no larger than about 0.5μ.

3,607,794

PROCESS OF REACTING ORGANIC POLYISOCYANATE WITH ALKALI METAL SILICATE SOLUTION

William Abbotson; John Miles Macnair; Frederick James Wallace, and Peter John Hancox, all of Nechells, Birmingham, England, assignors to Conteki Developments Limited, London, England

Filed May 3, 1968, Ser. No. 726,553
Claims priority, application Great Britain, May 12, 1967, July 28, 1967, 32190/67;34884/67
Int. Cl. C08g *22/46, 53/08*
U.S. Cl. 260—2.5 A 10 Claims

Siliceous products may be made by direct reaction between an alkali metal silicate and an organic isocyanate or isothiocyanate. By varying the proportions, reaction conditions and ingredients used, products varying from light cellular foams, to mastics and high-density solids may be obtained.

3,607,795

CELLULAR PLASTICS OF EPOXY RESINS AND PROCESS FOR THEIR MANUFACTURE

Ernst Nolken, Frankfurt am Main, and Hans Dexheimer, Kelkheim, Taunus, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

Filed Jan. 17, 1969, Ser. No. 792,165
Claims priority, application Germany, Jan. 22, 1968, P 17 20 775.9
Int. Cl. C08g *53/10*
U.S. Cl. 260—2.5 EP 6 Claims

A process for foaming and hardening an epoxy resin or mixtures of an epoxy resin with a lactone or a cyclic ether under the action of inert readily /volatile organic solvents as foaming agents and a mixture of a Lewis acid with phosphoric acid and/or a phosphoric acid derivative containing at least one POP group.

3,607,796

FOAM-FORMING POLYPROPYLENE COMPOSITION

Hans Eberle, Limburgerhof, Pfalz, and Gerhard Wuttke, Neuhofen, Pfalz, both of Germany, assignors to Grunzweig & Hartmann Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Jan. 24, 1969, Ser. No. 793,914
Claims priority, application Germany, Jan. 27, 1968, P 16 94 357.0
Int. Cl. C08f *3/08, 29/12, 47/10*
U.S. Cl. 260—2.5 E 23 Claims

A foam-forming polypropylene composition comprising

a. a major proportion of a stereoregular propylene polymer having a relatively high molecular weight, the said molecular weight being too high to permit foaming of the polymer by means of a low-boiling hydrocarbon blowing agent;

b. a minor proportion of a relatively low molecular weight heptane-soluble propylene polymer; and

c. a blowing agent having sufficient affinity for the low molecular weight polypropylene to be absorbed thereby, the said blowing agent being substantially homogeneously distributed throughout the entire polymer mass due to the solubility of the low molecular weight polypropylene in the high molecular weight polypropylene.

3,607,797

COMPOSITE CELLULAR MATERIAL

Louis C. Rubens, Midland, and Donald H. Clarke, Essexville, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 20, 1969, Ser. No. 801,162
Int. Cl. C08g *41/04*
U.S. Cl. 260—2.5 AK 4 Claims

The disclosure concerns composite cellular material comprising foamed styrene polymer bodies dispersed in a polyurethane foam matrix and a method of making the cellular material.

3,607,798

HALOGEN TREATMENT OF AROMATIC POLYAMIDE-SHAPED ARTICLES

Stephen S. Hirsch, Raleigh, N.C., assignor to Monsanto Company, Saint Louis, Mo.

Filed July 17, 1967, Ser. No. 653,626
Int. Cl. C08g *10/38, 53/08, 53/20*
U.S. Cl. 260—2.5 N 4 Claims

A process for the conversion of thermally stable aromatic polyamide-shaped articles into dimensionally stable fireproof products which involves a constructive heat treatment at elevated temperatures in an elemental halogen-containing atmosphere under carefully controlled conditions.

3,607,799

PROCESSES FOR GRAFTING VINYL-TYPE COMPOUNDS TO CELLULOSIC MATERIALS

Herbert S. Barbehenn; Gerald M. Leszyk, and Edward D. Morrison, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 24, 1969, Ser. No. 868,988
Int. Cl. C08f *1/34*
U.S. Cl. 260—17A 8 Claims

It has been found that the age of ceric ion/nitric acid redox catalysts has a significant effect on the degree of reactivity of vinyl compounds (such as, for example, acrylonitrile) with cellulosic materials. Whereas, the catalyst complex ap-

parently loses its efficacy with the passage of time, it has been found that by aging the catalyst complex for a period of at least several hours after it is initially prepared (before the catalyst complex is added to the other reactant), a very high degree of catalyst stability, catalyst predictability and catalyst efficacy results.

3,607,800

WATER-DISPERSIBLE POLYURETHANE RESINS

Kazys Sekmakas, Chicago, Ill., assignor to De Soto, Inc., Des Plaines, Ill.

Filed Feb. 24, 1969, Ser. No. 801,783
Int. Cl. C08g *41/00;* **C08j** *1/46*
U.S. Cl. 260—18 PT **13 Claims**

Water-dispersible polyurethane resins are provided by reacting a resinous polyol with a stoichiometric deficiency of polyisocyanate to provide an hydroxy-functional polyurethane in which carboxyl functionality is generated with a portion of the carboxyl functionality being preferably consumed by reaction with monoepoxide to generate hydroxy ester groups.

3,607,801

ORGANOPOLYSILOXANE COMPOSITIONS

Michael Fulton, Cowbridge, Glamorgan, Wales, assignor to Midland Silicones Limited, Reading, Berkshire, England

Filed July 16, 1969, Ser. No. 842,333
Claims priority, application Great Britain, July 22, 1963, 34,893/68
Int. Cl. C08g *31/09*
U.S. Cl. 260—18 S **4 Claims**

The tin carboxylate catalyst employed in room temperature vulcanizing silicone rubber systems based on hydroxyl endblocked diorganosiloxanes and silicate cross-linking agents is admixed with polyalkoxysilyl endblocked diorganosiloxane fluids for ease and accuracy of measurement and mixing.

3,607,802

METHYLOLATED ACRYLAMIDE INTERPOLYMERS CONTAINING ISOBUTYL ACRYLATE AND HYDROXY POLYESTERS

Kazys Sekmakas, Chicago, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Nov. 27, 1968, Ser. No. 779,604
Int. Cl. C08g *51/72, 17/16, 37/34*
U.S. Cl. 260—21 **9 Claims**

Organic solvent-soluble thermosetting acrylic interpolymers uniquely adapted for coil coating application are provided by interpolymerizing from 6%–15% acrylamide or methacrylamide with from 10%–35% of polyethylenically unsaturated polyester having an hydroxy value of 150–350, from 30%–60% of isobutyl acrylate, from 10%–22% of styrene or vinyl toluene, and from 2%–15% methyl methacrylate. The amide component is methylolated and the interpolymer is provided with an acid number of from 3–20 in order to provide a rapid curing system which will have the gloss, flexibility, hardness and solvent resistance required for coil coating application and which will, nonetheless, provide superior flow and wetting characteristics.

3,607,803

STABLE PREPARATIONS OF MODIFIED AMINOPLAST PRECONDENSATES, PROCESSES FOR THEIR MANUFACTURE AND USE

Rosemarie Toepel, Basle; Heinz Abel, Reinach/Bl, and Arthur Maeder, Therwil, all of Switzerland, assignors to Ciba Limited, Basel, Switzerland

Filed Oct. 29, 1969, Ser. No. 872,368
Claims priority, application Switzerland, Nov. 8, 1968, 16733/68
Int. Cl. C08g *37/30;* **C09d** *3/50*
U.S. Cl. 260—21 V **9 Claims**

Stable preparations of modified aminoplast precondensates are provided, which are prepared by reacting aminoplast precondensates containing alkyl-ether groups with basic polyamides. The polyamides are made from polymeric unsaturated acids and polyalkylene polyamines. The reaction is carried out in the presence of organic solvents at 20° to 100° C. Not later than after completion of the reaction, it is ensured that a sample of the reaction mixture has a pH-value of 2 to 8 after dilution with water. The resulting reaction products are soluble in water and are useful in the textile industry e.g. for rendering wool nonfelting. Especially suitable are the preparations when applied in combination with a dyeing process.

3,607,804

DYEABLE PILL RESISTANT POLYESTERS

Akihiro Nishimura, Williamsburg, Va., assignor to Dow Badische Company, Williamsburg, Va.

Filed July 16, 1969, Ser. No. 842,390
Int. Cl. C08f *21/04;* **C08g** *17/16*
U.S. Cl. 260—22 D **16 Claims**

Improved polyesters consist of the condensation product of a polyhydric alcohol, a major proportion of a first dibasic acid, a minor proportion of a long chain dibasic acid having molecular weight of 550 to 2,500, and optionally, a minor proportion of a long chain polyfunctional compound having 30 to 60 carbon atoms and at least three reactive sites.

3,607,805

PROCESS FOR STABILIZING VINYL HALIDE RESINS

Raymond E. Meyers, Westchester, Ill., and Edgar W. Eubanks, Westview Village, Ohio, assignors to SCM Corporation, Cleveland, Ohio

Filed Jan. 15, 1969, Ser. No. 791,499
Int. Cl. C08f *47/00, 45/58*
U.S. Cl. 260—23 EP **9 Claims**

A method for improving the thermal stability of vinyl halide resins formed by dispersion polymerization techniques is disclosed. To achieve this improved stability an effective amount of a hydrophobic, lipophilic organic epoxide compound is admixed with the polymerization dispersion after the polymerization is substantially completed, but before the vinyl halide resin is separated from the aqueous polymerization medium.

3,607,806

STABLE ORGANIC SOLVENT SOLUTIONS OF CALCIUM STEARATE

John S. Taylor, Newark, Del., and Wilbur T. Brader, Jr., Media, Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed Mar. 13, 1969, Ser. No. 807,066
Int. Cl. B01f *1/00*
U.S. Cl. 260—23 XA **9 Claims**

A volatile organic solvent solution of permanently dissolved calcium stearate and a method of preparing the same, are disclosed herein. Such solutions are particularly useful as coating compositions containing film-forming resins.

3,607,807

HIGH SOLIDS RUBBER LATEX AND METHOD

George R. Huddleston, Jr., Baton Rouge, La., assignor to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Filed June 13, 1969, Ser. No. 832,971
Int. Cl. C08d *5/00*
U.S. Cl. 260—23.7 A **10 Claims**

The preparation of a high solids, low viscosity rubber latex by blending a fast reaction latex of small particles with a slow reaction latex of large particles, before concentration, and preferably before stripping for removal of unreacted monomers, stripping and concentrating the blend to about 50 percent solids, freezing the concentrate after acidifying to a pH of about 8.3, and then thawing and concentrating the frozen blend to a solids content above 60 percent.

3,607,808
THERMOPLASTIC INK
Stanley P. Thompson, and Don L. Shofner, both of Bartlesville, Okla., assignors to Phillips Petroleum Company
Filed Dec. 19, 1966, Ser. No. 602,551
Int. Cl. C08f 29/02
U.S. Cl. 260—27 2 Claims

A composition of matter useful for printing at elevated temperatures comprising polyethylene, an ester of rosin and minor amounts of coloring matter.

3,607,809
BLAST FURNACE TAPHOLE PLUGS
Pierre Elby, 76 Rue du Chivaire, Berck, Sur-mer 62, France
Filed Aug. 1, 1967, Ser. No. 657,499
Claims priority, application France, June 28, 1967, 112,264
Int. Cl. C08g 51/52; C08f 45/52; B22c 1/22
U.S. Cl. 260—28 4 Claims

This invention relates to anhydrous plugs for stopping the tapholes of blast furnaces. This plug comprises, as a basic refractory material, a mixture consisting of low alumina pure silica and one or more refractory or gritty clays, and, as a binder, a resin or a plastic material containing a setting retarder such that the plug be heat stable at about 200° C.

3,607,810
AQUEOUS ALKALINE SOLUTIONS OF POLYHYDRAZIDES
Albert Schopf, Hering, Odenwald, and Gerhard Meyer, Obernburg, Blumenstrasse, both of Germany, assignors to Glanzstaff AG, Wuppertal, Germany
Filed May 7, 1968, Ser. No. 727,374
Claims priority, application Germany, May 10, 1967, G 50052 IVc/39b
Int. Cl. C08g 51/24, 20/22; D01f 7/04
U.S. Cl. 260—29.2 N 10 Claims

As a composition of matter, a dilute aqueous alkaline solution in which there is dissolved a polyhydrazide characterized by recurring polymeric units of the formula

$$+NH-NH-CO-R-CO-NH-NH-CO-R'-CO+_n \quad (I)$$

in which R and R′ represent divalent aromatic or heterocyclic radicals such a phenylene, naphthalene or diphenylether and n is a large integer. This alkaline polymer solution can be used to form shaped products which in turn can be converted by heating into thermally-stable and insoluble polyoxadiazoles.

3,607,811
STABLE PHENOL FORMALDEHYDE RESIN SOLUTION FOR PREPARATION OF FIRE-RESISTANT LAMINATES
Sivert Hovd, Flattenlia, Porsgrunn, Norway, assignor to Norsk Spraengstofindustri A/S, Oslo, Norway
Filed Dec. 6, 1968, Ser. No. 781,962
Claims priority, application Norway, Dec. 13, 1967, 170,967
Int. Cl. C08g 51/04
U.S. Cl. 260—29.3 3 Claims

The invention relates to an aqueous alcoholic phenol formaldehyde resin solution suitable for one-step impregnation of kraft paper for the preparation of fire-resistant laminates, containing alkyl phosphates and/or salts thereof and ammonium bromide.

3,607,812
METHOD OF MANUFACTURING POLYVINYL ALCOHOL FILMS AND PRODUCT
Bin Takigawa; Akio Wakabayashi; Tanio Hayashi, and Masanori Kasagi, all of Tokyo, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 17, 1968, Ser. No. 784,471
Int. Cl. B29f 3/00; D01f 1/02
U.S. Cl. 260—29.6 B 8 Claims

A method of manufacturing a polyvinyl alcohol film insoluble in water at a temperature below 40° C. by adding 13 to 5 parts by weight of a polyhydric alcohol plasticizer to 87 to 95 parts by weight of polyvinyl alcohol resin which has a polymerization degree of from 700 to 1,500 and a hydrolysis degree of at least 97 mol percent and contains less than 0.5 percent by weight of sodium acetate, drying the mixture to reduce the moisture content to less than 2 percent by weight and finally melt extruding the mass into a film with a die heated to temperatures of from 190° to 250° C.

3,607,813
PRINTING INK COMPOSITIONS
Chester L. Purcell, and John B. Wheeler, III, both of Somerville, N.J., assignors to Union Carbide Corporation, New York, N.Y.
Continuation-in-part of application Ser. No. 584,086, Oct. 4, 1966, now abandoned. This application Sept. 5, 1969, Ser. No. 855,746
Int. Cl. C08f 45/24; C09d 5/02
U.S. Cl. 260—29.6 10 Claims

Printing ink compositions having excellent gloss, adhesion and scuff resistance on such substrates as paper, treated polyethylene, aluminum or glass have been formulated from inorganic salts of interpolymers of ethylene and an acrylic acid and pigments.

3,607,814
COMPOSITION OF MATTER COMPRISING A SOLUTION OF A POLYIMIDE IN A MIXTURE OF SOLVENTS
Roland Ralph DiLeone, Rowayton, Conn., assignor to American Cynamid Company
Filed Feb. 17, 1969, Ser. No. 799,896
Int. Cl. C08g 51/32, 51/34
U.S. Cl. 260—30.4 N 2 Claims

A composition of matter comprising a solution of a polyimide of a 3,4-dicarboxy-1,2,3,4-tetrahydro-1-naphthalene succinic dianhydride and a diprimary diamine in the presence of a mixture of solvents comprising butyrolactone and a ketone selected from the group consisting of acetophenone, isopharone, benzophenone propiophenone and cyclohexanone in certain proportions and solids.

3,607,815
DYEABLE POLYOLEFIN FIBER
Tad L. Patton, Baytown, Tex., assignor to Esso Research and Engineering Company
Filed May 21, 1968, Ser. No. 730,915
Int. Cl. C08f 45/22, 45/50
U.S. Cl. 260—30.6 12 Claims

Disclosed is an improvement in the drawing of fiber from a polyolefin blend containing up to about 10 percent by weight of a dye receptor additive wherein the drawing utilizes a drawbar heated from about 65° C. to about 140° C. The improvement comprises employing as a dye receptor additive a polymer of a vinyl pyridine base plasticized with a minor amount of plasticizer to have a glass transition temperature equal or lower than the temperature to which the drawbar is heated, whereby the vinyl pyridine polymer substantially elongates with the polyolefin during drawing. A dyeable composition consists of a polymer of a vinyl pyridine base mixed with a minor portion of a plasticizer. A dyeable fiber is prepared from a blend of a fiber-forming polyolefin with up to about 10 percent, based on weight of the blend, of a polyvinylpyridine plasticized with a sufficient amount of plasticizer to reduce the glass transition temperature of the polyvinylpyridine to a level equal or lower than the temperature at which the drawbar is heated in the drawing of the fiber.

3,607,816

SOLUTIONS IN ORGANIC SOLVENTS OF COPOLYMERS OF ACRYLIC OR METHACRYLIC ESTERS

Klaus Holzer, Frankenthal; Alfred Mueller, Biblis, and Bernhard Dotzauer, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed June 3, 1969, Ser. No. 830,131
Claims priority, application Germany, June 6, 1968, P 17 69 528.2
Int. Cl. C08f *15/40, 45/30, 55/36*
U.S. Cl. 260—31.2 X 11 Claims

Solutions of solution copolymers of 60 to 90 percent of (meth) acrylic esters of alkanols containing from four to ten carbon atoms, 0.15 to 3 percent of olefinically unsaturated alkanediol monoesters and olefinically unsaturated alkoxymethylamides with or without up to 39 percent of other olefinically unsaturated monomers can be used for the production of contact adhesive layers having particularly advantageous properties.

3,607,817

PRODUCTION OF DYEABLE POLYACRYLONITRILE COMPOSITIONS AND ARTICLES

Louis E. Trapasso, Westfield, and Charles L. Smart, Millington, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Mar. 9, 1967, Ser. No. 621,762
Int. Cl. C08f *15/40, 29/56, 37/18*
U.S. Cl. 260—32.6 15 Claims

Dyeable (especially cationic-dyeable) acrylonitrile (AN) compositions and articles (e.g., films and filaments) are produced from blends of (I) a particular ternary or higher multicomponent AN polymer and (II) a copolymer of vinyl acetate and N,N-dimethylacrylamide wherein the latter constitutes from 1 to 90 percent by weight of the said copolymer. The polymer of (I) contains at least three different copolymerized monomers of the kind and in average percent mers, based on the total number of mers from individual monomers employed in making the copolymer, as follows:

A from 85 to 99% AN;

B from 1 to 14.5% of

a. a vinylidene halide, or
b. a dye diffusion-promoting, ethylenically unsaturated monomer that is copolymerizable with the other components of the copolymer, e.g., vinyl acetate, acrylic and methacrylic acids, methacrylonitrile, methacrylamide, N-isooctylacrylamide, N,N-dimethylacrylamide, diacetone acrylamide and the monoallylether of trimethylolpropane, and

C. from 0.15 percent to about 2 percent of a water-soluble salt of an organic sulfonic acid, e.g., vinylsulfonic, allylsulfonic, methallylsulfonic acids, and especially organic sulfonic acids wherein the sulfo group is separated from the ethylenic unsaturation by at least three carbon atoms, e.g., styrenesulfonic acid.

The total of A, B and C is 100 percent.

The amount of the copolymer of (II) that is blended with the AN polymer of (I) is, for example, from 2–15 wt. percent of the total of (I) and (II).

The components may be dry-blended, but are preferably blended while dissolved in a common solvent, e.g., dimethylacetamide, The solutions can be cast to form cationic-dyeable films or wet-spun to form cationic-dyeable filamentary materials and other shaped articles.

3,607,818

OPAQUE POLYESTER FILM

Michael P. Trubisky, Fairport, N.Y., and Darrell J. Parish, Circleville, Ohio, assignors to E.I. du Pont de Nemours and Company, Wilmington, Del.

Filed July 23, 1968, Ser. No. 746,761
Int. Cl. C08k *1/16*
U.S. Cl. 260—33.2 R 12 Claims

Polyester film suitable for support of photosensitive coatings rendered opaque by incorporation of carbon black and adherable by flame treatment.

3,607,819

BUTADIENE-STYRENE COPOLYMER INTERCONNECTED WITH SILICON OIL-EXTENDED AND STABILIZED

Joseph A. Beckman, Akron, and Jerry Donald Hunt, Cuyahoga Falls, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed June 16, 1969, Ser. No. 833,687
Int. Cl. C08d *11/04*
U.S. Cl. 260—33.6 AQ 2 Claims

An unvulcanized interconnected linear rubbery polymer of conjugated dienes of 4 and 5 carbon atoms and copolymers thereof with olefins, preferably oil diluted, is stabilized by the reaction product of boric acid and salicylic acid.

3,607,820

PRINT PASTES AND DYE PASTES

Hans Wilhelm, Ludwigshafen/Rhine; Klaus Gulbins, Limburgerhof/Pfalz; Gerhard Faulhaber, Manheim, and Wolfgang Schwindt, Ludwigshafen/Rhine, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Nov. 20, 1967, Ser. No. 684,496
Claims priority, application Germany, Nov. 24, 1966, P 16 19 353.6
Int. Cl. C08f *45/28*
U.S. Cl. 260—33.6 13 Claims

Print pastes and dye pastes for printing and dyeing fibrous materials based on organic dispersion of cross-linkable copolymers as binders for the pigments. The disperse copolymers, which can be used as binders without emulsions, are prepared by polymerization of (a) monomers which bear N-methylol groups or N-alkoxymethyl groups with (b) comonomers which do not contain any of the groups specified under (a), in (c) an organic liquid in which the copolymer is insoluble, and in the presence of a copolymer of comonomers of groups (a) and (b) which is soluble in (c) and acts as a polymeric emulsifier.

3,607,821

PROCESS OF PREPARING STABLE DISPERSIONS OF SYNTHETIC POLYMER PARTICLES IN AN INERT ORGANIC LIQUID

Michael R. Clarke, Frankston, Victoria, and Leon Filipowicz, East St. Kilda, Victoria, both of Australia, assignors to Balm Paints Limited, Melbourne, Victoria, Australia

Filed June 27, 1968, Ser. No. 740,469
Claims priority, application Australia, July 6, 1967, 24202/67
Int. Cl. C08f *47/20;* C08j *1/46*
U.S. Cl. 260—34.2 8 Claims

Stable dispersions of synthetic polymer in an inert organic liquid in which the polymer is insoluble are prepared by forming the particles in the liquid in the presence in solution in the liquid of a polymeric stabilizer which associates with the particles and provides around the particles a stabilizing steric barrier. Additionally, the stabilizer is coreacted with the disperse polymer, each coreacted stabilizer molecule forming covalent links with the disperse polymer. The coreaction may be an addition or a copolymerization reaction.

3,607,822

THIXOTROPICAL POLYURETHANE COMPOSITIONS

Kenichi Nishino, Takatsuki-shi, Japan, assignor to Takeda Chemical Industries, Ltd., Higashi-ku, Osaka-shi, Japan

Filed Mar. 18, 1968, Ser. No. 714,005
Claims priority, application Japan, Mar. 23, 1967, 42/18137
Int. Cl. C08g *51/04, 51/14*
U.S. Cl. 260—37 7 Claims

A thixotropical polyurethane composition comprising 100 weight parts of a polyurethane prepolymer, 0.1 to 50 weight parts of colloidal silica of an average particle size of 3 to 50 μ 0.001 to 50 weight parts of at least one ethylene glycol

polymer, having an average molecular weight of 100 to 20,000, of the group consisting of polyethylene glycol, polyethylene glycol ether and polyethylene glycol ester; the weight ratio of said ethylene glycol polymer to said colloidal silica being in the range of between 0.05:1 and 0.5:1.

3,607,823

DISPERSION OF TITANIUM DIOXIDE IN POLYAMIDES

Lawrence W. Crovatt, Jr., Gulf Breeze, Fla., assignor to Monsanto Company, Saint Louis, Mo.

Filed May 27, 1968, Ser. No. 732,153
Int. Cl. B29b *3/04*; **C08g** *51/04*
U.S. Cl. 260—37 N **5 Claims**

The agglomeration of titanium dioxide in polyamides containing a metal salt electrolyte is substantially inhibited by combining the titanium dioxide and the metal salt electrolyte in the polyamide under substantially anhydrous conditions.

3,607,824

MODIFIED GLYCIDYL ISOCYANURATE RESINS AND PROCESS

Zissis Aggias, Hilden/Rhineland, and Gunter Tauber, Dusseldorf-Reisholz, both of Germany, assignors to Henkel & Cie GmbH, Dusseldorf-Holthausen, Germany

Filed Mar. 6, 1969, Ser. No. 804,989
Claims priority, application Switzerland, Mar. 12, 1968, 3608
Int. Cl. C08g *51/04*
U.S. Cl. 260—37 N **6 Claims**

An adhesive composition which is liquid or pasty at room temperature comprising a reaction product of (1) a content of triglycidyl isocyanurate having an epoxide oxygen content of at least 14 percent, (2) an epoxide resin hardener anhydride of an organic polycarboxylic acid having a melting point below 40° C., (3) an organic polycarboxylic acid polyanhydride, and (4) a thixotrophy-producing means, said reaction product produced by homogenizing said ingredients at temperatures between 50° C. and 80° C., as well as the process of producing said adhesive composition and its utilization.

3,607,825

REINFORCED MOLDABLE COMPOSITION AND PROCESS OF PRODUCING THE SAME

Richard F. Shannon, Lancaster, Ohio, assignor to Owens-Corning Fiberglas Corporation

Division of Ser. No. 329,312, Dec. 9, 1963, Pat. No. 3,499,955.
Filed Nov. 5, 1969, Ser. No. 871,252
Int. Cl. C08g *51/04*
U.S. Cl. 260—38 **18 Claims**

This invention relates to a reinforced moldable composition and the process of producing the same, and more particularly, to such a composition which includes a bonding material and glass both in fibrous form and in flake or platelet form and which is substantially free of entrapped vapors.

3,607,826

STABILIZATION OF ETHYLENE POLYMERS

Willard Henry Wharton, Lake Jackson; Wayne Cole Brady, Angleton, and Michael Calvin McGaugh, Angleton, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 14, 1968, Ser. No. 752,721
Int. Cl. C08f *45/08, 45/56, 45/58*
U.S. Cl. 260—41 R **7 Claims**

Ethylene polymer of increased stability against oxidative degradation are described wherein a stabilizing amount of carbon black, a dithiodibenzoic acid, and an alkylated hydroxy anisole are incorporated into the polymer.

3,607,827

VINYLIDENE FLUORIDE POLYMER COMPOSITIONS

Andrew Anthony Dukert, Ambler, and Alkis Christofas, Philadelphia, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Feb. 13, 1969, Ser. No. 799,084
Int. Cl. C08f *45/04*; **C09d** *3/76*
U.S. Cl. 260—41 **10 Claims**

A resin composition comprising a blend of from about 50 to 99 weight percent of vinylidene fluoride polymer and 1 to 50 weight percent of diallyl phthalate monomer or prepolymer is useful in preparing a coating having high softening point, good heat stability and solvent resistance.

3,607,828

ULTRA VIOLET STABILIZED POLYOLEFINS

Edward Walter Hussey, Orange, Tex., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 1, 1970, Ser. No. 12,849
Int. Cl. C08f *45/02, 45/60*
U.S. Cl. 260—41 R **6 Claims**

Polyolefins stabilized against ultra violet light with nickel dialkyl dithiocarbamates and 2-hydroxy-4-octyloxybenzophenone.

3,607,829

SULFUR-CURABLE ELASTOMER HAVING IMPROVED BUILDING TACK

Alexander T. Harris, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed July 31, 1968, Ser. No. 748,951
Int. Cl. C08d *9/08, 9/16*
U.S. Cl. 260—41.5 R **14 Claims**

A sulfur-curable synthetic elastomer is tackified by mixing with an isoprenoidal resin characterized by a polymer of an isoprene/piperylene co-dimer and an allylically terminated cyclo compound, such as dicyclopentadiene.

3,607,830

CARRIER MEDIUM FOR LIQUID N,N′POLYTHI-BIS-DIALKYLAMINE

James E. Kearnan, Yorktown Heights, and Edward D. Weil, Yonkers, both of N.Y., assignors to Stauffer Chemical Company, New York, N.Y.

Filed Oct. 30, 1968, Ser. No. 772,007
Int. Cl. C08f *27/06*
U.S. Cl. 260—41.5 **3 Claims**

A curing agent for rubber compounds consisting essentially of a liquid N,N′-polythio-bis-dialkylamine curing agent absorbed into finely divided solid carrier which is inert to the reaction of the rubber compound which is in the form of a free flowing nonsticky powder which has nondusting, semipelletized characteristics and releases the liquid curing agent in the rubber compound at cure temperatures without loss of any effectiveness.

3,607,831

THERMOPLASTIC POLYACETALS STABILIZED WITH AMINOCARBOXYLIC AMIDES

Bruno Sander, and Wilhelm Schuette, both of Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Germany

Filed Oct. 16, 1968, Ser. No. 768,158
Claims priority, application Germany, Oct. 17, 1967, Oct. 17, 1967, P 16 69 727.1;P 16 69 728.2
Int. Cl. C08f *45/60*
U.S. Cl. 260—45.9 **7 Claims**

A process for stabilizing polyacetals against thermal degradation by adding special aminocarboxylic amides of the type of β-aminolactamide, with or without polycondensates of isophthalic diamide, N,N′-alkyleneureas and formaldehyde.

3,607,832

SILICON-CONTAINING COMPOSITIONS

Peter R. A. Hansen, Glamorgan, Wales, assignor to Midland Silicones Limited, Reading, Berkshire, England

Filed Oct. 13, 1969, Ser. No. 866,030
Claims priority, application Great Britain, Oct. 18, 1968, 49,618/68
Int. Cl. C08f *11/04*
U.S. Cl. 260—46.5 UA 9 Claims

Organosilicon compositions comprising (1) a compound containing aliphatic carbon atoms linked by multiple bonds, such as isoprene or organopolysiloxanes containing vinyl substituents, (2) a silicon compound containing at least one ≡SiH in the molecule, such as methylhydrogen polysiloxane, (3) a platinum catalyst, and (4) a sufficient amount to retard reaction at room temperature between (1) and (2) of a compound containing at least one ketoxime group, such as methylethyl ketoxime, are disclosed as heat curable elastomers.

3,607,833

PREPOLYMER OF EPOXY RESIN AND TRIS(HYDROXYMETHYL) AMINOMETHANE AND CURABLE COMPOSITION THEREOF

Ronald L. De Hoff, Maplewood, N.J., and George D. Grieco, Ridgefield, Conn., assignors to R. T. Vanderbilt Company, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 767,846, Oct. 15, 1968, now abandoned. This application Oct. 3, 1969, Ser. No. 863,710
Int. Cl. C08g *30/10*
U.S. Cl. 260—47 8 Claims

The specification relates to accelerating the cure of epoxy resins by incorporating a prepolymer of an epoxy resin with tris(hydroxymethyl) aminomethane. The specification also relates to alcohol solutions of this prepolymer for the preparation of paint films and the like.

3,607,834

COATING AND BONDING AGENTS OF ACETOACETATES OF POLYVALENT METALS, DILUENTS AND COPOLYMERS OF ACETOACETIC ACID ESTERS

Matthias Marx, Bad Duerkheim; Hermann Pankraz Hofmann, Frankenthal, Upper Palatinate, and Hans Klug, Lampertheim, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed June 26, 1968, Ser. No. 740,104
Claims priority, application Germany, June 28, 1967, P 16 44 988.0
Int. Cl. C08f *11/00*; C08s *15/00*; C08g *25/00*
U.S. Cl. 260—63R 4 Claims

Coating and bonding agents based on mixtures of acetoacetates of polyvalent metals, diluents, copolymers of polymerizable acetoacetic esters having the general formula where Y is a hydrocarbon radical and R is H or CH_3, and acrylic and/or methacrylic esters and/or styrene given hard and clear films which are resistant to weathering and may chemicals.

3,607,835

ACRYLONITRILE COPOLYMERS AND METHOD OF PREPARING THEM

Teo Paleologo; Roberto Costa, and Luigi Lugo, all of Milan, Italy, assignors to Societa Italiana Resine S.p.A., Milan, Italy

Filed Dec. 16, 1968, Ser. No. 784,169
Claims priority, application Italy, Dec. 20, 1967, 24187-A/67
Int. Cl. C08f *15/38*, *15/40*
U.S. Cl. 260—63 N 13 Claims

Dyeable acrylonitrile copolymers for spinning contain as comonomers diacetonacrylamide and esters selected from methyl and ethyl esters of acrylic and methacrylic acids.

3,607,836

NEW COLOR IMPROVED POLYESTERS OF CHLORENDIC ACID OR ANHYDRIDE

Richard L. Smith, Chattanooga, Tenn., assignor to Velsicol Chemical Corporation, Chattanooga, Tenn.

Filed Feb. 14, 1969, Ser. No. 799,528
Int. Cl. C08g *17/10*, *51/58*
U.S. Cl. 260—75 4 Claims

This invention discloses the improvement in the preparation of unsaturated polyesters of chlorendic acid or anhydride which comprises carrying out the esterification reaction in the presence of a color inhibiting amount of a combination of phosphoric acid and 2,6-di-*t*-butyl-*p*-cresol.

3,607,837

WATER-SOLUBLE URETHANE-UREA POLYMERS PREPARED BY MELT POLYMERIZATION

Sidney L. Reegen, Oak Park, and Bernard A. Merkl, Detroit, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Nov. 12, 1968, Ser. No. 775,130
Int. Cl. C08g *22/00*
U.S. Cl. 260—77.5 AM 11 Claims

Water-soluble urethane-urea polymers are prepared by the reaction of polyoxyalkylene glycols or copolymers of polyoxyalkylene glycols or blends thereof with an excess of organic polyisocyanates to form an isocyanate-terminated prepolymer, partially curing the prepolymer by exposing it to atmospheric moisture, and then chain-extending with a diamine. The reactions are carried out in the absence of a solvent.

3,607,838

PROCESS FOR PRODUCING POLYIMIDES IN GLYCOL

Jorg Strickrodt, Heinrick Stoerl Strasse 39/3011, Laatzen, and Ullrich Konig, Holbeinstrasse 12/334, Wolfenbuttel, both of Germany

Filed Jan. 28, 1970, Ser. No. 6,595
Int. Cl. C08g *20/32*
U.S. Cl. 260—78 TF 3 Claims

The present invention relates to a process for producing polyimides in which both the formation of intermediate products, the polyamide acids, and also the formation of polyimides, for example, at two different temperatures, are carried out in glycol, and recovery of the pure polyimides follows through filtration and drying.

3,607,839

DODECANOLACTAM POLYMERIZATION PROCESS

Harry McGrath, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 6, 1968, Ser. No. 727,015
Claims priority, application Great Britain, May 10, 1967, 21666/67
Int. Cl. C08g *20/18*
U.S. Cl. 260—78 L 3 Claims

Anhydrous polymerization of dodecanolactam by heating with an alkaline catalyst and an amide R_1CONHR_2 wherein one of R_1/R_2 is aryl and the other is aryl, alkyl or cycloalkyl.

3,607,840

METHOD FOR MANUFACTURING POLYHEXAMETHYLENEADIPAMIDE

Shozo Yura, and Yoshio Koyake, both of Kyoto-shi, Japan, assignors to Honshu Chemical Industry Co. Ltd., Chuo-ku, Tokyo, Japan

Filed Dec. 16, 1968, Ser. No. 784,219
Claims priority, application Japan, Aug. 2, 1968, 43/54309
Int. Cl. C08g *20/20*
U.S. Cl. 260—78 R 2 Claims

The present invention provides an improved method for manufacturing polyhexamethyleneadipamide directly from

hexamethylenediamine and adipic acid ester by heating adipic acid ester together with hexamethylenediamine and water to hexamethylene diammonium adipate (hereinafter called AH salt), the alcohol formed during said heating process being taken out of the system continuously by distillation, and then polymerizing said AH salt.

Further advantages offered by the method according to the present invention are that the product is less colored and the alcohol formed from the adipic acid ester can be recovered with a high yield.

3,607,841

PRODUCTION OF POLY-2,2-DISUBSTITUTED-β-PROPIOLACTONES

Masataka Nakahara, Takatsuki, and Yasuhiro Ogawa, Suita, both of Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1968, Ser. No. 710,776

Claims priority, application Japan, Mar. 22, 1967, 42/17832

Int. Cl. C08g *17/017*

U.S. Cl. 260—78.3 **5 Claims**

A method of producing poly-α,α-disubstituted-β-propiolactones by ring-opening polymerizing a compound of the formula wherein R_1 and R_2 are aryl or alkyl having 1–4 carbon atoms, in the presence of an anionic polymerization catalyst, characterized by conducting the polymerization in the presence of a molecular weight controlling agent selected from the group consisting of acid anhydrides, aldehydes, sulfoxides, organic acids and phenolic compounds in order to control the molecular weight of the polymer.

3,607,842

COPOLYMERS OF A CONJUGATED DIENE AND MALEIC ANHYDRIDE

Chester L. Parris, Morris Plains, and Leo S. Rieve, Schooleys Mountain, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed July 18, 1969, Ser. No. 843,187

Int. Cl. C08f *17/00, 1/28*

U.S. Cl. 260—78.5 R **9 Claims**

Substantially equimolar copolymers of a conjugated diene, such as butadiene, and a comonomer which is maleic anhydride or acrylonitrile can be prepared by copolymerizing the conjugated diene and the comonomer in an inert organic solvent in the presence of a Ziegler-type catalyst. The reaction proceeds rapidly at room temperature to yield a copolymer which is useful to form shaped articles.

3,607,843

PROCESS FOR MAKING POLY (PHENYLENE SULFIDE) POLYMERS OF INCREASED MOLECULAR WEIGHT

Fernando C. Vidaurri, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed May 16, 1969, Ser. No. 825,448

Int. Cl. C08g *23/00*

U.S. Cl. 260—79 R **5 Claims**

The inherent viscosity of poly(phenylene sulfide) polymers is substantially increased and the range narrowed by recycling to the reactor as one of the reaction ingredients previously produced poly(phenylene sulfide) polymer.

3,607,844

PROCESS FOR THE PREPARATION OF POLY(TRITHIOCARBONATE)

Ray D. Taylor, Brecksville, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed Oct. 1, 1969, Ser. No. 862,968

Int. Cl. C08g *23/00*

U.S. Cl. 260—79 **8 Claims**

Poly(trithiocarbonate) is prepared by the reaction of alkali or alkaline earth metal trithiocarbonate and halogen at a controlled pH in an aqueous reaction medium. The process gives high purity and high molecular weight poly(trithiocarbonate) in yields as high as 90 percent.

3,607,845

FERRIC CHLORIDE CURED MERCAPTAN-TERMINATED POLYMERS

Robert W. Ireland, and Douglas E. Skillicorn, both of Avon Lake, Ohio, assignors to The B. F. Goodrich Company, New York, N.Y.

Filed Oct. 6, 1969, Ser. No. 864,217

Int. Cl. C08g *23/00*

U.S. Cl. 260—79 **8 Claims**

Mercaptan-terminated liquid polymers in combination with ferric chloride and amine accelerators provide curable one-component elastomeric compositions suitable for sealant and caulking compositions.

3,607,846

PROCESS OF JOINING LITHIATED POLYMERS OR COPOLYMERS

Adel F. Halasa, Akron, and David P. Tate, Northfield, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of application Ser. No. 709,885, Mar. 4, 1968, and a continuation-in-part of 760,077, Sept. 16, 1968. This application Jan. 21, 1969, Ser. No. 792,825

Int. Cl. C08d *5/04, 5/02, 5/00*

U.S. Cl. 260—85.1 **15 Claims**

Polymers of increased molecular weight are produced from plastic and/or rubbery polymers derived from vinylidene monomers by reaction with an organic halogen compound in the presence of an alkali metal hydrocarbon and also in the presence of an accelerator which is a Lewis base. The reactant polymers include polystyrene and similar plastic polymers and rubbery polymers such as polybutadiene and butadiene-styrene copolymers. The organic halogen compound is any carbon compound containing at least one reactive halogen atom per molecule. The halogen is fluorine, chlorine, bromine and/or iodine. The alkali metal hydrocarbon is preferably a "live" polymer containing reactive alkali metal, e.g., polybutadiene produced by polymerization of butadiene-1,3 by means of a lithium initiator. The Lewis base may be organic or inorganic, but it is preferred to use organic compounds and especially ethers. Preferred products are nonflow rubbery polymers.

3,607,847

HALOGENATED ACRYLIC MONOMERS AND POLYMERS

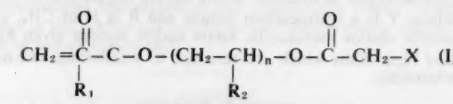
Maurice Troussier, Pierre-Benite, and Edouard Grimaud, Oullins, both of France, assignors to Ugine Kuhlmann, Paris, France

Division of Ser. No. 610,238, Jan. 19, 1967. Filed Oct. 2, 1969, Ser. No. 871,058

Int. Cl. C08f *15/16*

U.S. Cl. 260—86.1 **10 Claims**

Halogenated acrylic monomers of the formula

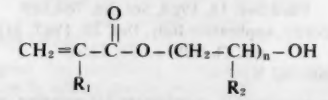


(I)

wherein R_1 and R_2 each is a hydrogen atom or a methyl group, X is a chlorine or a bromine atom, and n is an integer from 1 to 5, are prepared by reacting in the presence of an acid acceptor, (a) halogenated acetyl chloride of the formula

$$XCH_2COCl \qquad (II)$$

wherein X is a chlorine or a bromine atom and (*b*) hydroxyl group containing acrylic monomers of the formula



wherein *R1*, *R2* and *n* each has the same meaning as statec hereinabove. The halogenated acrylic monomers thus produced are suitable for preparing polymers containing reactive halogen atoms.

3,607,848

METHOD FOR PREPARING INSOLUBLE, CROSS-LINKED ORGANIC HYDROGELS COMPRISING COPOLYMERS OF GLYCOL MONOESTERS WITH DIESTERS

Vladimir Stoy; Richard Chromecek; Zdenek Tuzar; Miroslav Stol; Karel Kliment; Jaroslava Otoupalova, and Miloslav Bohdanecky, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed July 23, 1968, Ser. No. 746,735
Claims priority, application Czechoslovakia, Aug. 7, 1967, PV 5701-67
Int. Cl. C08f *15/18*
U.S. Cl. 260—86.1 6 Claims

Insoluble hydrogels are prepared by cross-linking linear or branched soluble copolymers of glycol methacrylates or glycol acrylates with glycol dimethacrylates or glycol diacrylates, preferably in presence of glycol acrylate or glycol methacrylate monomers which may contain the respective diester, and preferably also in presence of initiators liberating free radicals, and in presence of solvents having the interaction parameter χ. Soluble glycol methacrylate or acrylate polymers can be used in form of fine solid particles and the cross-linking may be aided by heating till to about 150° C.

3,607,849

BULK COPOLYMERIZATION OF VINYL CHLORIDE AND ONE, TWO-TRANS-DICHLORETHYLENE

Robert Buning, Oberlar; Karl-Heinz Diessel, Troisdorf; Siegmund Frick, Oberlar, and Gerhard Bier, Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf (Bez. Cologne), Germany

Filed Sept. 29, 1966, Ser. No. 583,005
Claims priority, application Germany, Oct. 2, 1965, D 48 388
Int. Cl. C08f *1/04, 1/62, 15/06*
U.S. Cl. 260—87.5 5 Claims

Production of an improved chlorinated polymer by the low temperature bulk copolymerization of vinyl chloride and 1,2-trans dichloroethylene where the polymerization is carried out to at least a 30 percent conversion of monomers at a temperature of −5 to −30° C. and under substantially shearing action.

3,607,850

POLYMERS OF CONJUGATED FLUORINATED DIENES AND METHOD OF MAKING, USING AS THE CATALYST A RHODIUM SALT OR COMPLEX

Homer P. Smith, Little Falls, N.J., assignor to The United States of America as represented by the Secretary of the Army

Filed Apr. 8, 1969, Ser. No. 814,450
Int. Cl. C08f *3/20, 15/06*
U.S. Cl. 260—87.5 1 Claim

Method of polymerizing conjugated fluorinated dienes in aqueous emulsions wherein a rhodium salt or rhodium complex which is water-soluble catalyzes the polymerization and increases the conversion of the conjugated fluorinated dienes to polymers thereof.

3,607,851

POLYMERIZATION OF CONJUGATED DIOLEFINS

Lawrence E. Forman, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 24, 1969, Ser. No. 819,089
Int. Cl. C08f *7/04*; C08d *3/08, 1/16*
U.S. Cl. 260—94.2 M 1 Claim

Conjugated diolefins, with or without vinyl aromatic comonomers, are polymerized using a catalyst which is a combination of ROK and R′K, where R is an alkyl or alkenyl radical, and R′ is an alkenyl radical. Polymerization of 1,3-butadiene in this system results in a product which is primarily trans-1,4-polybutadiene, with essentially no cis-1,4-polybutadiene.

3,607,852

VINYL ESTER POLYMERIZATION IN ALCOHOL AND WATER SOLUTION

Wilfried Eichhorn, Kelfheim, Taunus; Gerhard Roh, Hofheim, Taunus, and Peter Seibel, Frankfurt, Main, all of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister, Lucius & Bruning, Frankfurt am Main, Germany

Filed Mar. 6, 1969, Ser. No. 804,933
Claims priority, application Germany, Mar. 19, 1968, P 17 20 806.9
Int. Cl. C08f *3/54*
U.S. Cl. 260—89.1 6 Claims

A process for the solution polymerization of a vinyl ester in the presence of an alcohol and a free radical polymerization catalyst is shown. Water in controlled amounts is added to the feed mixture of monomer, alcohol and catalyst prior to their entering the first polymerization zone.

3,607,853

PROCESS FOR THE PREPARATION OF TRANS-POLYPENTENAMER

Wolfgang Oberkirch, Cologne-Stammheim; Peter Gunther, Opladen, and Josef Witte, Cologne-Stammheim, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 9, 1969, Ser. No. 865,183
Claims priority, application Germany, Oct. 25, 1968,
Int. Cl. C08f *3/02*
U.S. Cl. 260—93.1 9 Claims

A process for the polymerization of cyclopentene with ring-opening, in which cyclopentene dissolved in an inert organic solvent is polymerized in the presence of a catalyst, characterized in that an organometallic mixed catalyst of

a) a molybdenum, tungsten or tantalum salt,

b) tertiary butyl hypohalite,

c) an organic aluminium compound in the molar ratio of a:b:c as 1:0.1 to 5:0.8 to 15 is used.

3,607,854

METHOD OF PRODUCING CIS-1,4-POLYISOPRENE

Helena Antropiusova, Prague; Karel Mach, Roztoky u Prahy; Bohumir Matsyska, Horni Pocernice; Jaromif Trneny, Kralupy nad VL ta vou, and Cestmir Vyroubal, Kralupy nad VL ta vou, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of application Ser. No. 729,896, May 17, 1968, now abandoned. This application Oct. 28, 1968, Ser. No. 771,286
Int. Cl. C08d *3/12*
U.S. Cl. 260—94.3 10 Claims

Isoprene is readily polymerized to have over 90 percent repeating isoprene units in the 1,4-cis configuration if the polymerization catalyst employed is prepared by reaction of titanium tetrachloride with an excess of dialkylaluminum fluoride. The proportions of the reactants are not critical because the resulting reduction of Ti^{IV} does not go beyond Ti^{III}. The alkyl bound to aluminum should have 1 to 5 carbon atoms. Ethers may be added to the catalyst reaction mixture.

3,607,855

CONTINUOUS PRODUCTION OF CHLORINATED POLYOLEFINS

Hans-Georg Trieschmann, Hambach, and Gerhard Zeitler, Hessheim, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Rhineland-Pfalz, Germany

Filed Sept. 16, 1968, Ser. No. 762,314
Claims priority, application Germany, Sept. 16, 1967, 17 20 302
Int. Cl. C08f *27/03*
U.S. Cl. 260—94.9 H 9 Claims

A continuous process for the chlorination of polyolefins in the presence of chlorohydrocarbons.

3,607,856

OXIDIZED MANGANESE CATALYST AND POLYMERIZATION PROCESS OF ETHYLENE

Edwin F. Peters, Lansing, Ill., assignor to Standard Oil Company, Chicago, Ill.

Filed May 9, 1967, Ser. No. 637,083
Int. Cl. C08d *3/04, 3/06, 3/10*
U.S. Cl. 260—94.9 2 Claims

A novel catalyst composite for the polymerization of unsaturated organic compounds is oxidized manganese extended on a support used in conjunction with an organoaluminum compound.

3,607,857

PROCESS OF REMOVING ACRINOL FROM GAMMA GLOBULIN USING SILICEOUS MATERIAL SUCH AS SILICA GEL

John W. Nelson, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of application Ser. No. 812,404, Apr. 1, 1969 now abandoned. This application Mar. 3, 1970, Ser. No. 16,225
Int. Cl. C07g *7/00*
U.S. Cl. 260—112 9 Claims

Removal of acrinol (ethacridine lactate monohydrate) from blood proteins, especially Y-globulin, is accomplished by treating aqueous acrinol solutions of the proteins with a siliceous material which preferentially absorbs the acrinol. Free of acrinol, Y-globulin from sera or plasma especially immune sera or plasma is useful in combatting rejection of tissue and organ transplants and in replacement management of gamma globulin.

3,607,858

PROCESS FOR PREPARING LYOPHILIZED HUMAN BLOOD PROTEINS SUCH AS GAMMA GLOBULIN IN THE PRESENCE OF A NONIONIC SURFACTANT

Merle Vernon Querry, Westwood, N.J., and Francis Fremonte Buck, Suffern, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 31, 1970, Ser. No. 24,364
Int. Cl. C07g *7/00*
U.S. Cl. 260—112 B 4 Claims

Human blood proteins, such as alpha globulin, beta globulin, albumin, and particularly gamma globulin, are prepared in dry lyophilized form by freeze drying an aqueous solution in the presence of small amounts of nonionic surface active agents, the initial freezing being very rapid, from 1 to 3 minutes, preferably by freezing in small containers, such as vials, immersed in an alcohol Dry Ice bath.

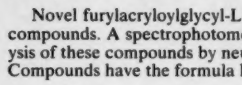
3,607,859

FURYLACRYLOYLGLY-CLYCYL-L-LEUCINAMIDE AND RELATED PEPTIDES AND USE THEREOF IN SPECTROPHOTOMETRIC ASSAY FOR NEUTRAL PROTEASE

Joseph Feder, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed June 12, 1968, Ser. No. 744,286
Int. Cl. C07c *103/52*; C07d *5/16*; G01n *21/34*
U.S. Cl. 260—112.5 7 Claims

Novel furylacryloylglycyl-L-leucine amide (FAGLA) type compounds. A spectrophotometric assay, based upon hydrolysis of these compounds by neutral protease, is also provided. Compounds have the formula I:



wherein: X is oxygen or sulfur, R is hydrogen or lower-alkyl, and R′ is lower-alkyl or phenyllower-alkyl. FAGLA is the preferred compound.

3,607,860

PROCESS FOR THE PRODUCTION OF SOY PROTEINS HAVING GEL FORMING ABILITY

Yukiomi Yamato, Kawanishi-shi; Hitoshi Taniguchi, Osaka-shi; Sadao Nakayama, Osaka-fu, and Teisaburo Tateishi, Osaka-fu, all of Japan, assignors to Fuji Oil Company Limited, Osaka-shi, Japan

Filed Nov. 28, 1967, Ser. No. 686,338
Claims priority, application Japan, Dec. 1, 1966, 41/78819
Int. Cl. A23l *1/20*
U.S. Cl. 260—123.5 7 Claims

A soy protein having excellent water-solubility, gel-forming ability, water-binding property and emulsifying property is obtained by separating the protein at a temperature below 80° C. in an acidic condition from soy milk which is obtained from soybean meal or soybeans by water extraction, alkalizing the protein with an alkalizing agent, returning the pH to about neutral with acid and thereafter heating the resulting protein solution at a temperature above 60° C.

3,607,861

PROCESS FOR THE PREPARATION OF WATER-INSOLUBLE AZO-DYESTUFFS

Oskar Braun, Frankfurt am Main, and Reinhold Deubel, Kelkheim, Taunus, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft Vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

Filed Feb. 1, 1968, Ser. No. 702,184
Claims priority, application Germany, Feb. 4, 1967, F 51442
Int. Cl. C09b *35/04*; G03f *7/100*
U.S. Cl. 260—176 7 Claims

Process for the preparation of a water-insoluble azo-dyestuff having particularly good qualities for printing by adding in the coupling process an auxiliary comprising a mixture consisting essentially of a primary aliphatic amine and/or a salt thereof with a low-molecular weight fatty acid, and of an aminoxide or phosphine oxide which contains a long-chained hydrocarbon radical.

3,607,862

PROCESS FOR PREPARING CARBOHYDRATE KETALS

Gerald Myer Jaffe, Verona; William Szkrybalo, Verona, and Peter Hans Weinert, Wayne, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 4, 1969, Ser. No. 796,578
Int. Cl. C07c *47/18*
U.S. Cl. 260—209 R 29 Claims

Preparation of ketal sugars from sugars utilizing perchloric acid as a catalyst.

3,607,863

CLATHRATE COMPOUNDS

Werner Dosch, Mainz, Germany, assignor to Dyckerhoff Zementwerke A.G., Wiesbaden-Amoneburg, Germany

Filed Feb. 28, 1967, Ser. No. 619,486
Int. Cl. C07c *47/18*; C07f *15/02*
U.S. Cl. 260—209 10 Claims

A composition composed of an inorganic carrier material of the formula

$$4\,MeO \cdot X_2O_3 \cdot n\,aq$$

wherein

Me is an alkaline earth metal,
X is trivalent iron or aluminum,
aq is water of crystallization, and
n is at least 7,

having adsorbed thereto or included in its crystal lattice a polar organic compound or a non-polar organic compound and a polar organic compound. Said carrier material may contain anions such as SO_4^{-2}, CO_3^{-2}, or Cl^- and may be alkylated.

The resulting adsorption complex, inclusion or clathrate compound is stable, of a high degree of crystalline orderliness, and uniform in its physical and chemical properties.

It is prepared by contacting the inorganic carrier material with the liquid or gaseous organic compound or with its solution. It is also obtained by adding the organic compound

during preparation of the inorganic carrier material.

The adsorption complexes, inclusion or clathrate compounds are useful for modifying cement and concrete, for storing insecticides, perfumes, drugs, dyes etc. to be released at the site of their use, and for many other technical purposes.

The inorganic carrier material is obtained, for instance, by reacting mono-or tricalcium aluminate or tetracalcium aluminate ferrite with water or calcium hydroxide suspensions or by reacting alkali aluminate solutions with the oxides or hydroxides of calcium or magnesium.

3,607,864

PROCESS FOR PREPARING NEOMYCIN UNDECYLENATE

Alfred Halpern, Great Neck, N.Y., assignor to Synergistics, Inc., New York, N.Y.

Filed Apr. 21, 1969, Ser. No. 817,876
Int. Cl. C07c *129/18*
U.S. Cl. 260—210 NE **6 Claims**

The method for preparing neomycin undecylenate in pure form by reacting an acid salt of neomycin with an alkali metal or an ammonium salt of undecylenic acid in an inert saline medium containing not more than 10 percent of inorganic salt ions, so that the formed neomycin undecylenate may be readily separated, washed free of contaminants and dried.

3,607,865

PREPARATION OF XANTHATES

John Dyer, Media, and Lyle H. Phifer, West Chester, both of Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed May 28, 1968, Ser. No. 732,551
Int. Cl. C07c *69/32*
U.S. Cl. 260—234 R **10 Claims**

A method of forming alcohol xanthates utilizing a transxanthation reaction between an alcohol xanthate and an alcohol, is disclosed herein.

3,607,866

3,4-DIHYDRO-1H-1,3,4-BENZOTRIA-ZEPINE-2,5-DIONES AND THEIR PREPARATION

Denis M. Bailey, E. Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Aug. 15, 1968, Ser. No. 752,770
Int. Cl. C07d *55/54*
U.S. Cl. 260—239.3 B **22 Claims**

1-R′-3-R″-4-R‴-3,4-dihydro-1H-1,3,4-benzotriazepine-2,5-dione where R′ is hydrogen, lower-alkyl, lower-alkenyl, halo-(lower-alkenyl), phenyl-(lower-alkyl)-, phenyl, phenyl-O-Y-, B=N-Y- or B=N-$COCH_2$- where Y is polycarbon-lower-alkylene and B=N is lower-tertiary-amino, and R″ and R‴ are each hydrogen or lower-alkyl, having sedative and anti-inflammatory activities, are prepared by reacting a lower-alkyl N-R′-N-(lower-carbalkoxy)anthranilate with a hydrazine of the formula R″-NHNH-R‴

3,607,867

PURIFICATION OF BENZODIAZEPINE DERIVATIVES

Shigeho Inaba, Takarazuka-shi; Toshiyuki Hirohashi, Kobe; Takahiro Izumi, Takarazuka-shi, and Hisao Yamamoto, Nishinomiya-shi, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Feb. 14, 1969, Ser. No. 799,503
Claims priority, application Japan, Feb. 21, 1968, 43/011300
Int. Cl. C07d *53/06*
U.S. Cl. 260—239.3 D **8 Claims**

A 1-alkyl-5-phenyl-7-chloro-1,3-dihydro-2H-1,4-benzodiazepine-2-one derivative, which is useful as a tranquilizer, a muscle relaxant or a spasmolytic, is purified by dissolving a crude benzodiazepine derivative in hydrochloric acid, partially neutralizing by adding an aqueous alkali solution to deposit impurities such as 2-methylamino-5-chlorobenzophenone, removing the deposited impurities from the solution by filtration, further adding the aqueous alkali solution to the filtrate and separating the purified benzodiazepine derivative from the filtrate by solvent extraction.

3,607,868

Δ^4-3-OXO ANDROSTENES AND PROCESS FOR THEIR MANUFACTURE

Georg Anner, Basel, and Peter Wieland, Oberwil, Basel-Land, both of Switzerland, assignors to CIBA Corporation, Summit, N.J.

Filed July 22, 1968, Ser. No. 746,278
Claims priority, application Switzerland, Dec. 4, 1964, 15741/64
Int. Cl. C07c *173/00*
U.S. Cl. 260—239.55 **16 Claims**

The invention involves converting a Δ^5-3-hydroxy-17-androstene, in known manner, into the ethyleneketal, brominating, then oxidizing the brominated steroid in a neutral or preferably basic medium and finally eliminating hydrogen bromide from the resulting product. This $\Delta^{4,6}$-3,17-dioxoandrostadiene-17-ethyleneketal may be treated with dilute acid to form the free dioxo compound or treated with methyl magnesium halide in the presence of copper salt to form a Δ^4-3,17-dioxo-17α- and 17β-methyl androstene-17-ethyleneketal. The ketals may be converted into the free dioxo compounds.

3,607,869

PROCESS FOR HYDROLYZING 7-AMINOCEPHALOSPORANIC ACID LACTONE

Constantino John Di Cuollo, Drexel Hill; George L. Dunn, Wayne, and Louis R. Fare, La Fayette Hill, all of Pa., assignors to Smith Kline & French Laboratories, Philadelphia, Pa.

Filed Nov. 17, 1969, Ser. No. 877,481
Int. Cl. C07d *99/24*
U.S. Cl. 260—243 **4 Claims**

Desacetyl 7-aminocephalosporanic acid is obtained chemically in reasonable yield from desacetyl 7-aminocephalosporanic acid lactone by subjecting the lactone in a basic water-containing medium to a pH of 11–13 for 5 seconds to 5 minutes.

3,607,870

PRODUCTION OF DITHIOCARBAMATES

Friedrich Becke, Heidelberg, and Helmuth Hagen, Ludwigschafen/Rhineland, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengeselischaft, Ludwigschafen am Rhineland-Pfalz, Germany

Filed May 13, 1968, Ser. No. 728,833
Claims priority, application Germany, May 13, 1967, P 16 70 223.1
Int. Cl. C07d *87/46*
U.S. Cl. 260—246 B **5 Claims**

Production of dithiocarbamates by reacting halogenated methanes with elementary sulfur and secondary amines. The products are valuable starting materials for the production of herbicides, fungicides, insecticides, rubber auxiliaries, and stabilizers in the petroleum industry.

3,607,871

2-CYCLOHEXYLALKANOYL-1-(TERTIARY-AMINO)-CYCLOALKENES

Sydney Archer, Bethlehem, and Roman R. Lorenz, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 589,201, Oct. 25, 1966, now Patent No. 3,523,959. This application Oct. 13, 1969, Ser. No. 866,008
Int. Cl. C07d *87/34*
U.S. Cl. 260—247.7 K **2 Claims**

2-Cyclohexylacetyl-1-BN-cyclohexene, 2-cyclohexylacetyl-1-BN-cyclopentene and 2-(3-cyclohexylpropanoyl)-1-BN-

cyclopentene are prepared respectively by reacting cyclohexylacetyl halide with 1-BN-cyclohexene or 1-BN-cyclopentene or reacting 3-cyclohexylpropanoyl halide with 1-BN-cyclopentene, where BN is morpholino, piperidino, pyrrolidino or di-(lower-alkyl)amino. These compounds are intermediates for the preparation of 2-hydroxy-3-(8-cyclohexyloctyl)-1,4-naphthoquinone and 2-hydroxy-3-(7-cyclohexylheptyl)-1,4-naphthoquinone, which are potent antimalarial agents.

3,607,872

PRODUCTION OF CYANURIC CHLORIDE

Jean Riethmann, Allschwil, Basel-Land, Switzerland, assignor to Geigy Chemical Corporation, Ardsley, N.Y.

Filed Sept. 17, 1969, Ser. No. 858,645
Int. Cl. C07d *55/42*
U.S. Cl. 260—248 C **4 Claims**

A new and improved procedure is provided for effectively extending the life of the activated carbon catalyst used in producing cyanuric chloride from gaseous cyanogen chloride. In the process, the moist gaseous cyanogen chloride feed stream is contacted with phosphorus pentoxide prior to its conversion to the desired cyanuric chloride product.

3,607,873

PRODUCTION OF CYANURIC CHLORIDE

John F. Ferguson, Ardsley, N.Y., and Philip G. McCracken, Baton Rouge, La., assignors to Geigy Chemical Corporation, Town of Greenburgh, N.Y.

Filed Sept. 17, 1969, Ser. No. 858,646
Int. Cl. C07d *55/42*
U.S. Cl. 260—248 C **4 Claims**

A new and improved procedure is provided for effectively extending the life of the activated carbon catalyst used in producing cyanuric chloride from gaseous cyanogen chloride. In the process, the moist gaseous cyanogen chloride feed stream is contacted with calcium sulfate prior to its conversion to the desired cyanuric chloride product.

3,607,874

PRODUCTION OF N-METHYLPIPERAZINE

Ernst Fuerst, Neustadt; Herbert Toussaint, Frankenthal, and Georg Sold, Schifferstadt, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Germany

Filed Nov. 21, 1968, Ser. No. 777,886
Claims priority, application Germany, Nov. 24, 1967, P 16 70 288.8
Int. Cl. C07d *51/66*
U.S. Cl. 260—268 SY **7 Claims**

Production of N-methylpiperazine by reaction of aqueous formaldehyde solution with piperazine followed by hydrogenation of the polymethylenepiperazine formed in the presence of known hydrogenation catalysts at superatmospheric pressure and elevated temperature, the reaction being carried out in the presence of acetic acid or piperazine acetate and the N,N′-dimethylpiperazine formed during the hydrogenation being distilled off as an azeotrope with water. N-methylpiperazine is used as a selective solvent for the extraction of aromatics from hydrocarbon mixtures.

3,607,875

METHOD OF PREPARING N,N-DIMETHYLPIPERAZINIUM HALIDE

Gordon R. Miller, and James C. Renfro, both of Lake Jackson, Tex., assignors to Dow Chemical Company, Midland, Mich.

Filed June 6, 1969, Ser. No. 831,214
Int. Cl. C07d *51/70*
U.S. Cl. 260—268 SY **6 Claims**

N,N-Dimethylpiperazinium halide is prepared in a novel reaction which comprises reacting by contacting N,N-dimethylethylenediamine with 1,2-dihaloethane.

3,607,876

3-[4-(SUBSTITUTED-OXY)-PHENYL]-2-SUBSTITUTED-PHTHALIMIDINES

Denis M. Bailey, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Nov. 27, 1968, Ser. No. 779,649
Int. Cl. C07d *27/52*
U.S. Cl. 260—294 AC **18 Claims**

3-(4-R-O-Phenyl)-2-Z-phthalimidines, having endocrinological activities, are prepared by reacting a 3-(4-hydroxyphenyl)phthalide with an amine of the formula Z-NH_2 and reacting the resulting 3-(4-hydroxyphenyl)-2-Z-phthalimidine with an R-halide where R is lower-alkyl, lower-carbalkoxy-(lower-alkyl), 2,3-epoxypropyl or BN-Y where BN is lower-tertiary-amino and Y is polycarbon-lower-alkylene, and Z is alkyl having from four to 10 carbon atoms, cycloalkyl having from three to eight ring-carbon atoms inclusive, phenyl and Q-phenyl where Q is from one to three substituents selected from halo, lower-alkyl, lower-alkoxy, trihalomethyl, hydroxy or benzyloxy.

3,607,877

PROCESS FOR CONVERTING AROMATIC THIOLS TO NITROSO AND NITRO COMPOUNDS

Penelope B. Domenico, Danville, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 31, 1968, Ser. No. 772,429
Int. Cl. C07d *31/40*
U.S. Cl. 260—290 **2 Claims**

A process is disclosed for converting aromatic thiols to the corresponding nitroso- or nitro-substituted compounds by treating the thiol compounds with an excess of nitric acid having a HNO_3 concentration of 90 to 100 percent. Representative starting compounds are benzenethiols and pyridinethiols which, in addition to the thiol group, are substituted with one or more electron-with-drawing groups such, for example, as chloro, nitro or cyano, among others. The nitroso and nitro compounds produced during the reaction have utility as pesticides and are variously effective as herbicides and in the control of fungi and nematodes as well as of parasites infecting warmblooded animals.

3,607,878

METHOD OF POLYMERIZATION OF TETRAFLUORETHYLENE

Edouard Grimaud, Oullins; Pierre Plurien, Palaiseau, and Maurice Troussier, Pierre Benite, all of France, assignors to Societe D'Electro-Chimie, D'Electro-Metallurgie Et Des Acieries Electriques D'Ugine

Continuation of application Ser. No. 557,464, June 14, 1966, now abandoned. This application Mar. 5, 1970, Ser. No. 20,464
Int. Cl. C08f *3/24, 45/24*
U.S. Cl. 260—29.6 **8 Claims**

An improved process for the production of aqueous colloidal dispersions of tetrafluoroethylene polymer wherein tetrafluoroethylene monomer is polymerized in the presence of water, a catalyst and a dispersing agent. The improvement comprising progressively introducing tetrafluoroethylene monomer and a dispersing agent into a reaction vessel wherein a small concentration of dispersing agent is present prior to the beginning of polymerization, at a rate which provides a concentration of dispersing agent which at each instant does not exceed by more than 10 percent the theoretical concentration required to provide continuous coverage of the entire surface of the polymerized particles formed with dispersing agent but which is sufficient to provide continuous coverage of at least 60 percent of the surface of said particles with dispersing agent.

3,607,879

CERTAIN 2-THIAZOLINEALKANOIC ACIDS AND ESTERS

Robert Anthony Newberry, Bourne End, England, assignor to John Wyeth & Brother Limited, Berkshire, England

Filed Apr. 8, 1969, Ser. No. 814,445
Claims priority, application Great Britain, Apr. 9, 1968, 16909/68
Int. Cl. C07d *91/24*
U.S. Cl. 260—306.7 **10 Claims**

This invention concerns 2,5-dicyclyl-4-hydroxy-2-thiazoline-4-alkanoic acids which are pharmacologically ef-

ficacious as anti-inflammatory agents and which are useful as intermediates in the preparation of the corresponding thiazoles.

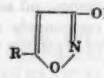
3,607,880

PREPARATION OF 3-HYDROXYISOXAZOLE COMPOUNDS

Kazuo Tomita, Tokyo, Japan, assignor to Sankyo Company Limited, Tokyo, Japan

Filed Feb. 9, 1970, Ser. No. 9,094
Int. Cl. C07d *85/22*
U.S. Cl. 260—307 H 4 Claims

In a process for preparing a 3-hydroxyisoxazole of the formula



wherein R is hydrogen or alkyl of 1 to 5 carbon atoms and wherein a compound of the formula

$$R—C \equiv C—COOR'$$

wherein R is as defined and R' is alkyl of 1 to 5 carbon atoms is reacted with hydroxylamine, the invention proposes that the reaction is conducted in the presence of an alkaline earth metal hydroxide in an amount of 0.5 to 1.5 moles per mole of free hydroxylamine base.

3,607,881

PHENYLBUTAZONE DERIVATIVES

Miguel Izquierdo, and Pedro Gomis, both of Barcelona, Spain, assignors to Laboratorios Hosbon S.A., Barcelona, Spain

Filed May 5, 1968, Ser. No. 734,528
Claims priority, application France, June 6, 1967, 109,213
Int. Cl. C07d *49/04*
U.S. Cl. 260—310 A 2 Claims

The compounds phenylbutazone 3,4,5-trimethoxybenzoate and γ-keto-phenylbutazone 3,4,5-trimethoxybenzoate and therapeutic compositions containing the same. The compounds have anti-inflammatory, analgesic and antipyretic properties and are well tolerated with low toxicity. They may be administered orally, rectally or parenterally. The compounds are prepared by reacting 3,4,5-trimethoxybenzoyl chloride with an alkaline enotate of the desired pyrazolone derivative.

3,607,882

PROCESS FOR PURIFYING ACETALS

Franz Wenger, 100 Memorial Drive, Apt. 8-7C, Cambridge, Mass.

Filed Feb. 29, 1968, Ser. No. 728,376
Int. Cl. C07c *43/30*; C07d *19/00*, *17/00*, *15/04*, *13/02*, *15/02*
U.S. Cl. 260—340 9 Claims

Acetals such as trioxane which contain impurities are purified by contacting them with an alkali metal ketyl such as one derived from benzophenone and p,p'-diphenylbenzophenone.

3,607,883

BROMINE CHLORIDE-DIOXANE COMPLEX

John A. Schneider, and Jack F. Mills, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 24, 1969, Ser. No. 819,541
Int. Cl. C07d *15/10*
U.S. Cl. 260—340.6 5 Claims

A bromine chloride complex of p-dioxane has been discovered which is useful as a solid source of bromine chloride. A dioxane-bromine chloride complex formed by mixing bromine chloride with dioxane in methylene chloride at 10° C. has been used to selectively brominate salicylanilide to give an 88 percent yield of 3,4',5-tribromosalicylanilide.

3,607,884

PREPARATION OF 5-CARBOXYPHTHALIDE IN LIQUID SODIUM TRIOXIDE

Le Roy S. Forney, Metuchen, N.J., assignor to Mobil Oil Corporation

Filed Mar. 11, 1969, Ser. No. 806,299
Int. Cl. C07d *5/40*
U.S. Cl. 260—343.3 1 Claim

5-Carboxyphthalide is prepared by reacting a concentrated solution of terephthalic acid in liquid SO_3 with formaldehyde. 5-Carboxyphthalide derivatives have been disclosed as lubricating oil additives in U.S. Pat. No. 3,261,780.

3,607,885

PREPARATION OF LACTONES SUCH AS SUBSTITUTED DELTA VALEROLACTONES

Robert A. Dombro, Chicago, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Aug. 15, 1968, Ser. No. 752,840
Int. Cl. C07d *7/06*
U.S. Cl. 260—343.5 9 Claims

Lactones may be prepared from alcohols by treating said alcohol with methyl alcohol in the presence of an alkaline substance and an oxidizing agent at an elevated temperature to prepare the desired product. Examples of such lactones are dimethyl, diphenyl, dicyclohexyl and di-p-tolyl-delta-valerolactones. These compounds have utility as solvents and as starting monomers in the preparation of polyester formulations, among other uses.

3,607,886

CHROMANAMINES

Ian Moyle Lockhart, Egham, Surrey, England, assignor to Parke, Davis & Company, Detroit, Mich.

Filed Apr. 24, 1969, Ser. No. 819,091
Int. Cl. C07d *7/20*
U.S. Cl. 260—345.2 3 Claims

An isomer of N,N,2-trimethyl-3-chromanamine, and its acid-addition salts (such as the hydrochloride, m.p. 217°–218πζ c.), having distinctive physicochemical and pharmacological properties. The compounds are produced by reacting the appropriate isomer of 2-methyl-3-chromanamine in free base or acid-addition salt form with a methylating agent.

3,607,887

PROCESS FOR THE PREPARATION OF MELLOPHANIC DIANHYDRIDE

Shinpei Gomi; Masaaki Takahashi, and Hiroshi Nagai, all of Tokyo, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 19, 1968, Ser. No. 760,971
Claims priority, application Japan, Sept. 20, 1967, 42/59916
Int. Cl. C07c *63/32*
U.S. Cl. 260—346.3 7 Claims

Mellophanic dianhydride is prepared by the reaction of cyclohexane-1, 2, 3, 4-tetracarboxylic acid and bromine followed by the dehydration of the mellophanic acid thus prepared.

3,607,888

25-HYDROXYTACHYSTEROL$_3$ 25-HYDROXYDIHYDROTACHYSTEROL$_3$ AND METHODS FOR PREPARING SAME

Hector F. DeLuca, and Tatsuo Suda, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Aug. 7, 1969, Ser. No. 848,334
Int. Cl. C07c *171/10*
U.S. Cl. 260—397.2 2 Claims

The new compounds 25-hydroxytachysterol$_3$, 25-hydroxydihydrotachysterol$_3$ and methods for preparing same. 25-hydroxydihydrotachysterol$_3$ is characterized by antirachitic activity and by its ability to induce bone mobilization and thereby increase serum calcium concentration indicating its application for the treatment of hypoparathyroidism. 25-hydroxytachysterol$_3$ is a valuable intermediate in the preparation of 25-hydroxydihydrotachysterol$_3$.

3,607,889

10B-METHYL-13B-POLYCARBONALKYLGON-4-EN-3-ONES

Donald P. Strike, Philadelphia; David R. Herbst, King of Prussia, and Herchel Smith, Wayne, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed May 19, 1966, Ser. No. 551,317
Int. Cl. C07c *169/20*
U.S. Cl. 260—397.4 9 Claims

13-Aklyl-10-methylgon-4-en-3-ones possessing androgenic, anabolic, progestational activity are prepared from the correspondingly substituted 13-alkyl-10-methylgonan-4-ones wherein groups labile to mesylation are protected to permit selective mesylation of subsequently formed 4-hydroxy group, by converting the 4-one to its 3-hydroxy-methylene derivative, hydrolyzing the oximino group, mesylating the 4-hydroxy group, catalytically hydrogenating the unsaturation at the 4-position, and eliminating the 4-mexyloxy group to form the 4-en-3-one conjugated system.

3,607,890

PROCESS FOR THE EXTRACTION OF A FRACTION OF THE UNSAPONIFIABLE OF A VEGETABLE OIL

Pierre Mastagli, Paris, France, assignor to Serdex-Societe D'Etudes, De Recherches, De Diffusion Et D'Exploitation, Levallois-Perret, France

Filed Sept. 30, 1969, Ser. No. 862,495
Claims priority, application France, Oct. 14, 1968, 169,758
Int. Cl. C07c *167/40*
U.S. Cl. 260—397.25 7 Claims

This process for the extraction of a fraction, principally citrostadienolic and/or cycloarthenolic, of the unsaponifiable of the vegetable oil comprises contacting the oil with dimethylformamide to form a dimethylformamide phase wherein the fraction is dissolved, separating said phase and then isolating the fraction therefrom.

3,607,891

PROCESS FOR PREPARING TRICYCLOHEXYLTIN HALIDES

Bernard G. Kushlefsky, Edison; Gerald H. Reifenberg, Hightstown; William J. Considine, Somerset, and Justin L. Hirshman, East Brunswick, all of N.J., assignors to M&T Chemicals Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 773,331, Nov. 4, 1968. This application Apr. 16, 1969, Ser. No. 816,783
Int. Cl. C07f *7/22*
U.S. Cl. 260—429.7 13 Claims

The process of this invention for preparing tricyclohexyltin halide $(C_6H_{11})_3SnX$ wherein X is selected from the group consisting of chloride and bromide comprises a first step of preparing organotricyclohexyltin by reacting as reactants organotin trihalide $RSnX_3$ with cyclohexyl magnesium halide $(C_6H_{11})MgCl$ in an amount of at least three moles of cyclohexyl magnesium halide per mole of organotin trihalide to form said organotricyclohexyltin and a second step of reacting as reactants said organotricyclohexyltin prepared in said first step and tin tetrahalide to produce said tricyclohexyltin halide.

3,607,892

CATALYTIC ADDITION OF STANNE TO OLEFINS

Gerald H. Reifenberg, Hightstown, and William J. Considine, Somerset, both of N.J., assignors to M & T Chemicals Inc., New York, N.Y.

Filed July 3, 1968, Ser. No. 742,165
Int. Cl. C07f *7/22*
U.S. Cl. 260—429.7 14 Claims

This invention comprises a method for producing tetraorganotin compounds comprising reacting stannane, SnH_4, and a compound selected from the group consisting of α-olefinic compounds and cycloolefinic compounds in the presence of a catalyst and recovering said tetraorganotin compounds.

3,607,893

ADDITION OF TRIHALOSTANNOUS ACID TO OLEFINS

Gerald H. Reifenberg, Hightstown, and William J. Considine, Somerset, both of N.J., assignors to M&T Chemicals Inc., New York, N.Y.

Filed Dec. 18, 1968, Ser. No. 784,879
Int. Cl. C07f *7/22*
U.S. Cl. 260—429.7 8 Claims

This invention comprises a method for producing organotin trihalides comprising reacting as reactants trihalostannous acid, $HSnX_3$, wherein X is halogen, in an ethereal solution, and a compound selected from the group consisting of α-olefinic compounds and cycoolefinic compounds and recovering said organotin trihalide compounds.

3,607,894

EXTRACTION OF ALKYL LEAD COMPOUNDS FROM ORGANOMETALLIC COMPLEXES

William H. Harwood, and Kang Yang, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Dec. 12, 1968, Ser. No. 783,395
Int. Cl. C07f *9/24*, *5/06*
U.S. Cl. 260—437 5 Claims

Alkyl cyanide compounds are disclosed as addition agents for improving the liquid-liquid extraction of alkyl lead compounds from mixtures thereof with organometallic complexes with an extraction medium comprising iso-octane.

3,607,895

BIS(ORGANOSILYL) TRIHYDROCARBYL SILYLAMINES

Richard P. Bush, Penarth, Glamorgan; Norman C. Lloyd, Cardiff, Glamorgan, and Christopher Pearce, Cowbridge, Glamorgan, all of Wales, assignors to Midland Silicones Limited, Reading, Berkshire, England

Filed June 4, 1968, Ser. No. 734,243
Claims priority, application Great Britian, June 12, 1967, 27067/67
Int. Cl. C07f *7/02*
U.S. Cl. 260—448.2 N 5 Claims

Novel organosilicon compositions are prepared which contain silicon to nitrogen bonds which are attached to functional atoms and radicals. The organosilicon compounds are depictable by the formula $(XR_2Si)_2NSiR'_3$ wherein X represents H, Cl, Br, I or a hydrocarbonoxy radical and each R and R' represent an alkyl radical containing less than 6 carbon atoms, in an alkenyl radical or a monocyclic aryl radical. These compounds are useful as intermediates in the production of other silazane or siloxazane derivatives.

3,607,896

PREPARATION OF MONO-HYDROCHLOROSILANES I

Keith W. Michael, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 19, 1969, Ser. No. 800,731
Int. Cl. C07f *7/08*, *7/12*
U.S. Cl. 260—448.2 E 6 Claims

Chlorosilanes of the formula R_xSiHCl_{3-x} are prepared by reacting $R_xSi(OR')Cl_{3-x}$ with dialkyl aluminum hydrides employing certain ethers such as 1,4-dioxane or dihexyl ethers. There are two variations of the process. One, the ether is present during reaction, in which case, the reaction temperature is in the range from −40° C. to above 25° C. Two, the reaction is carried out at temperature at or below about 25° C. and the ether is then added and the product distilled at temperatures which can be above 25° C.

3,607,897

PREPARATION OF MONOHYDROCHLOROSILANES II

Keith W. Michael, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 19, 1969, Ser. No. 800,715
Int. Cl. C07f 7/08, 7/12
U.S. Cl. 260—448.2 E 2 Claims

Chlorosilanes of the formula R_xSiHCl_{3-x} are prepared by reacting $R_xSi(OR')Cl_{3-x}$ with dialkyl aluminum hydrides at a temperature from −40° to 25° C. and thereafter separating the desired product from the reaction mixture at a temperature not exceeding 25° C.

3,607,898

PROCESS FOR PREPARING CYCLIC SYN-TETRAMETHYLTETRAVINYLTETRASILOXANE

Robert J. Macher, Elnora, N.Y., assignor to General Electric Company

Filed Aug. 20, 1969, Ser. No. 851,752
Int. Cl. C07f 7/02
U.S. Cl. 260—448.2 E 12 Claims

Cyclic sym-tetramethyltetravinyltetrasiloxane is produced from a hydrolyzate, consisting primarily of methylvinylpolysiloxane employing lithium hydroxide, in combination with a cocatalyst. Heating of the hydrolyzate with lithium hydroxide in combination with one of the cocatalysts provides for rearrangement of the hydrolyzate into cyclic organopolysiloxanes and for a high yield of the cyclic sym-tetramethyltetravinyltetrasiloxane to be distilled from the heated mixture avoiding cleavage of the vinyl groups and gelation of the starting material.

3,607,899

PRODUCTION OF TRIMETHYLSILYL-ENDBLOCKED TRIFLUOROPROPYLMETHYLPOLYSILOXANES

Eric D. Brown, and Loren A. Haluska, both of Midland, Mich., assignors to Dow-Corning Corporation, Midland, Mich.

Filed Sept. 29, 1969, Ser. No. 862,038
Int. Cl. C07f 7/02
U.S. Cl. 260—448.2 E 5 Claims

Trimethylsilyl-endblocked trifluoropropylmethylpolysiloxanes are produced by the acid-clay catalyzed reaction of the trifluoropropylmethylcyclotrisiloxane with a trimethylsilyl-endblocker.

3,607,900

TRANSHALOGENATION OF ORGANOSILICON HALIDES WITH SILICON TETRAFLUORIDE

George Morris Hart, Adrian, Mich., assignor to Stauffer-Wacker Silicone Corporation. Division of Ser. No. 689,755, Dec. 12, 1967, Pat. No. 3,507,799.

Filed Sept. 25, 1969, Ser. No. 871,347
Int. Cl. C07f 7/02
U.S. Cl. 260—448.2 E 4 Claims

An aqueous solution of tetrahydrofuran is saturated with silicon tetrafluoride and the resulting product, after removal of excess tetrahydrofuran, is applied as a transhalogenation reagent. The silicon tetrafluoride-tetrahydrofuran complex transhalogenation reagent is caused to react with diorganosilicon monohalides of the formula $(R)_2$ HSiX wherein R represents hydrocarbyl groups and X represents chlorine, bromine and iodine forming the fluoride analogue thereof.

3,607,901

METHOD OF MAKING ISOCYANATOALKYL-SUBSTITUTED SILANES

Abe Berger, Schenectady, N.Y., assignor to General Electric Company
Division of Ser. No. 669,298, Sept. 20, 1967, Pat. No. 3,494,951.

Filed Aug. 15, 1969, Ser. No. 870,717
Int. Cl. C07f 7/10, 7/18
U.S. Cl. 260—448.2 N 3 Claims

A method is provided for making various nitrogen-containing organosilicon compounds, such as silylorganoisocyanates, the corresponding carbamate and isocyanurates. The method involves contacting silylorganohalide and a metal cyanate in the presence of a suitable aprotic solvent. Nitrogen-containing organosilicon compounds are provided having silicon and nitrogen atoms separated by a divalent hydrocarbon radical. In instances where a urethane is desired, an appropriate aliphatic monohydric alcohol can be utilized in combination with the silylorganohalide and metal cyanate. The subject nitrogen-containing organosilicon compounds can be utilized for making silicon-organic copolymers and as treating agents for imparting water repellency to various substrates.

3,607,902

NEW SILICON DERIVATIVES OF ALLYL ALCOHOL

Pierre Brison, Oullins, and Marcel Lefort, Caluire, both of France, assignors to Rhone-Povlenc S. A., Paris, France

Filed Oct. 29, 1969, Ser. No. 872,369
Claims priority, application France, Oct. 31, 1968, 172,172
Int. Cl. C07f 7/18
U.S. Cl. 260—448.8 R 10 Claims

New organosilicon compounds based on allyl alcohol, which are 1-triorganooxysilyl-prop-1-en-3-ols or their 3-triorganosiloxy derivatives are useful as finishing agents for woven glass fabric/epoxy resin laminates or for adhesion undercoats in the glueing of organosilicon elastomers to metal or wooden supports.

3,607,903

PREPARATION OF AROMATIC ISOCYANATES

Zoltan Csuros, Budapest; Rudolf Soos, Budapest; Jozsef Bozzay, Budapest; Janos Dancso, Budapest; Dezso Ambrus, Budapest, and Jozsef Haraszti, Sajobabony, all of Hungary, assignors to Chemokomplex Vegyipari Gep es Berendezes Export-Import Vallalat, Nepkoztarsasag utja, Budapest, Hungary

Filed Nov. 13, 1967, Ser. No. 682,543
Claims priority, application Hungary, Nov. 18, 1966, CU-102
Int. Cl. C07c 119/04
U.S. Cl. 260—453 PH 8 Claims

A continuous process for the preparation of aromatic monoisocyanates, diisocyanates, or mixtures thereof, by contacting a corresponding amine with an amount of phosgene being in excess of that which is stoichiometrically required for the conversion of the amine, at a temperature between about 120° C. and about 200° C. The improvement of the invention comprises carrying out the reaction in two successive steps. Partial conversion, suitably up to between about 75 percent and about 88 percent of the starting amine, is accomplished in the first step, such as by contacting the amine with a preheated solution of suitably as much phosgene as is stoichiometrically required for the first step of the process. The product resulting from the first step is contacted in the second step with a further amount of phosgene which is in excess, preferably an excess of between about 5 percent and about 20 percent, over the amount of phosgene stoichiometrically required for substantially completing the conversion.

3,607,904

SULPHONATED S-ALKYL AND S-ARALKYL THIOSULPHATES

Jozef Frans Willems, Wilrijk, and Frans Clement Heugebaert, Kontich, both of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Antwerp, Belgium

Filed May 8, 1968, Ser. No. 727,665
Claims priority, application Great Britain, May 8, 1967, 21250/67
Int. Cl. C07c 139/00, 141/00
U.S. Cl. 260—453 6 Claims

A process of preparing an S-alkyl or S-aralkyl thiosulphate compound having the formula:

$$MO_3S—L_1—L_2—L_3—S—SO_3M$$

comprising the steps of mixing an intramolecular ester having the formula:

with an aqueous solution containing an inorganic thiosulphate and heating the mixture, wherein

each of L_1 and L_3 stands for a methylene group, and

L_2 stands for an alkylene group comprising from 1 to 3 carbon atoms in straight line, or

L_1 together with L_2 stands for the group $-\overset{Z}{\overset{/}{C}}=\overset{Z}{\underset{\backslash}{C}}-$

wherein Z represents the atoms necessary to close an aromatic nucleus, and M stands for a metal atom such as an alkali metal atom or an ammonium group, is described. The compounds are useful in photographic silver halide emulsions.

3,607,905

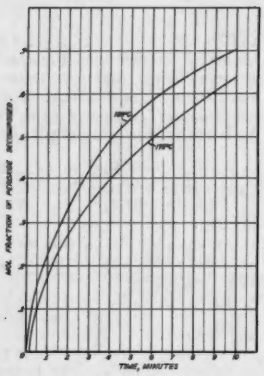
VAPORIZATION OF UNREACTED CYCLOHEXANE FROM CYCLOHEXANE OXIDATION PRODUCTS

Joseph L. Russell, Ridgewood, N.J., assignor to Halcon International, Inc.

Filed Feb. 19, 1968, Ser. No. 706,511

Int. Cl. C07f 5/04; C07c 35/08

U.S. Cl. 260—462 **3 Claims**



The present invention relates to a process for the oxidation of cyclohexane with molecular oxygen in the presence of boric acid-type additives to produce borate esters and is particularly concerned with vaporization of at least a part of the unreacted cyclohexane is the oxidation effluent under the conditions so as to minimize oxidation or oxygen transfer during this vaporization.

3,607,906

METHOD OF MAKING NITRILES FROM CARBOXYLIC ACIDS

Hansdieter Hofmann, Petter-Weil; Stefan Janacek, Dietzenbach, and Horst Corsepius, Frankfurt am Main, all of Germany, assignors to Vickers-Zimmer Aktiengesellschaft Planung und Bau von Industrieanlagen

Filed Nov. 20, 1968, Ser. No. 777,463

Claims priority, application Germany, Nov. 22, 1967, P 16 68 833.8

Int. Cl. C07c 121/10

U.S. Cl. 260—465.2 **4 Claims**

Nitriles and dinitriles of monocarboxylic and dicarboxylic acids are produced by evaporating the acid in a film-forming evaporating apparatus, which is preferably made of titanium or stainless steel, in the presence of 0.26 to 40 moles of superheated steam per mole of carboxylic acid, the evaporated acid and steam being then mixed with 4 to 60 moles of gaseous ammonia per mole of carboxylic acid and reacted in the gaseous phase at a temperature between 260° to 500° C. in the presence of a dehydrating catalyst.

3,607,907

PROCESS FOR MAKING COPOLYESTERS CONTAINING ETHER GROUPS

Herbert Eck, and Hellmuth Spes, both of Burghausen-Upper Bavaria, Germany, assignors to Wacker-Chemie G.m.b.H., Munich, Germany

Filed Oct. 18, 1967, Ser. No. 676,048

Claims priority, application Germany, Oct. 26, 1966, W 42670

Int. Cl. C07c 69/76; C08g 51/42

U.S. Cl. 260—473 G **5 Claims**

This invention relates to the manufacture of copolyesters containing ether groups, and it has for its object to provide a simple and efficient process for this purpose.

3,607,908

PROCESS FOR PURIFYING BIS (β-HDROXYETHYL) TEREPHTHALATE

Kichiji Enoki; Tokio Sumitani, and Yoichi Yoshihara, all of Takaoka-shi, Japan, assignors to Nippon Soda Kabushiki Kaisha, Tokyo-to, Japan

Filed Oct. 18, 1968, Ser. No. 768,912

Claims priority, application Japan, Oct. 23, 1967, 42/67863

Int. Cl. C07c 69/82

U.S. Cl. 260—475 PR **9 Claims**

Process for purifying crude bis (β-hydroxyethyl) terephthalate produced from crude terephthalic acid which comprises contacting a solution of crude bis (β-hydroxyethyl) terephthalate with light metal such as zinc, tin or magnesium, which is preferably used in the shape having a large surface area per unit volume, in the presence or absence of a water soluble organic or inorganic acid salt of said light metal.

3,607,909

NEW PHENYL-AMINO PROPANE DERIVATIVES

Laszlo Beregi, Boulogene; Pierre Hugon, Rueil-Malmaison, and Jean-CLaude Le Douarec, Suresnes, all of France, assignors to Science Union et Cie Societe Francaise de Recherche Medicale, Suresnes, France

Filed Mar. 31, 1967, Ser. No. 627,323

Claims priority, application Great Britain, Apr. 15, 1966, 16,660/66

Int. Cl. C07c 63/12

U.S. Cl. 260—477 R **6 Claims**

Trifluoromethylphenyl amino propane substituted on the nitrogen atom (1) optionally, by lower-alkyl of up to 5 carbon atoms, and (2) in any case, by $-(CH_2)_n-OR'$ wherein n is 2 or 3 and R′ represents hydrogen or -COR″ wherein R″ is lower-alkyl, lower-cycloalkyl, lower-alkenyl, or carbocyclic aryl.

These compounds possess anorexigenic, analgesic, anticonvulsant, and lipid metabolism regulating activity.

3,607,910

PROCESS FOR PRODUCING DIMETHYLIMINODIACETATE

Louis L. Wood, Potomac, Md., and Richard A. Hamilton, Houston, Tex., assignors to W. R. Grace & Co., New York, N.Y.

Filed June 13, 1969, Ser. No. 833,188

Int. Cl. C07c 101/20

U.S. Cl. 260—482 R **10 Claims**

"A method for producing dimethyliminodiacetate by reacting methanol with iminodiacetonitrile in the presence of anhydrous hydrogen chloride. Subsequently, adding anhydrous ammonium chloride to adjust the pH to from 6.5 to 8.5 and recover dimethyliminodiacetate."

3,607,911

BASIC AMINO ACID SALTS OF CHLORAMPHENICOL SUCCINATE

Yoshitaka Ikezuki; Sadayoshi Fujimori; Yuji, Kawashima and Yoshihisa Nozaki, all of Tokyo, Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1968, Ser. No. 756,547
Claims priority, application Japan, Aug. 31, 1967, 42/55490
Int. Cl. A61k *27/00*; C07c *69/40*, *103/40*
U.S. Cl. 260—485 G 1 Claim

The basic amino acid salts of chloramphenicol succinate cause little or no pain when administered intramuscularly to human beings.

3,607,912

PREPARATION OF ALKYL ESTERS OF A, B UNSATURATED MONOCARBOXYLIC ACIDS

James P. Russell, Berkeley, N.J., assignor to Air Products and Chemicals Inc., Allentown, Pa.

Filed Sept. 27, 1967, Ser. No. 671,116
Int. Cl. C07c *69/52*
U.S. Cl. 260—486 9 Claims

Lower alkyl esters of α,β-unsaturated monocarboxylic acids are converted to higher esters by treatment with the appropriate higher alcohol in the presence of an alkaline esterification catalyst, and in the presence of about 0.05 to about 2.5 weight percent of water.

3,607,913

PREPARATION OF TRICHLOROVINYL DICHLOROACETATE

Jerome M. Lavanish, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 29, 1968, Ser. No. 732,861
Int. Cl. C07c *69/62*; C08f *1/82*; C07c *121/32*
U.S. Cl. 260—487 8 Claims

Trichlorovinyl dichloroacetate is prepared by reacting a tertiary amine with an excess of dichloroacetyl chloride. Preferably, the reaction is conducted in the presence of an inert diluent.

3,607,914

PREPARATION OF ESTERS BY CARBONYLATION OF ETHERS

Bernhard Stouthamer, and Arien Kwantes, both of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed May 16, 1969, Ser. No. 825,251
Int. Cl. C07c *67/00*
U.S. Cl. 260—496 13 Claims

Esters are prepared by reacting carbon monoxide with an ether in the presence of water-containing liquid fluoride.

3,607,915

CONTINUOUS CATALYST REACTIVATION IN CARBOXYLIC ACID VINYLATION

Albertus C. H. Borsboom; Pieter A. Gautier, and Dirk Medema, all of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Apr. 8, 1968, Ser. No. 719,714
Claims priority, application Great Britain, Apr. 27, 1967, 19376/67
Int. Cl. C07c *67/04*
U.S. Cl. 260—498 6 Claims

A continuous process for producing vinyl carboxylates by reacting acetylene with carboxylic acids in the presence of a catalyst-containing reaction medium wherein catalyst is continuously reactivated by direct contact of a portion of reaction medium with the acid charge.

3,607,916

PROCESS FOR PRODUCING VINYL ACETATE

Naoya Kominami; Kusuo Kawarazaki, and Masao Hashinaga, all of Tokyo, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 23, 1966, Ser. No. 596,414
Claims priority, application Japan, Dec. 17, 1965, 40/77525
Int. Cl. C07c *67/04*
U.S. Cl. 260—497 A 2 Claims

The production of vinyl acetate by passing ethylene and oxygen through acetic acid in the presence of a catalyst comprising a noble metal and a promoter metal, wherein catalyst activity is maintained by including a small amount of mono-, di- or trichloracetic acid or salts thereof.

3,607,917

PHTHALATE SALT HYDROGENATION

Vernon W. Buls, Alamo, Calif., assignor to Shell Oil Company, New York, N.Y.

Filed Feb. 27, 1969, Ser. No. 803,102
Int. Cl. C07c *51/36*
U.S. Cl. 260—514 R 6 Claims

Salts of phthalic acids are hydrogenated to hexahydrophthalic acid salts at temperatures below 150° C. by liquid-phase contact with hydrogen in the presence of Raney nickel when excess alkali is present.

3,607,918

PREPARATION OF N,N-DIMETHYLTEREPHTHALAMIC ACID AND TEREPHTHALAMIDES FROM TEREPHTHALIC ACID AND ALIPHATIC AMIDES OR NITRILES

Anthony T. Jurewicz, Middlesex, N.J., assignor to Mobil Oil Corporation

Filed Jan. 10, 1969, Ser. No. 790,455
Int. Cl. C07c *103/33*
U.S. Cl. 260—518 R 6 Claims

Terephthalamide N-methyl derivatives are prepared by reacting terephthalic acid with lower alkyl cyanides or with lower alkanoic amides or N-methyl derivatives, in oleum solution, at atmospheric pressure, and at 25° C.–100° C.

3,607,919

PROCESS FOR THE OXIDATION OF AROMATIC COMPOUNDS

Bruno J. Barone, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Feb. 23, 1967, Ser. No. 617,803
Int. Cl. C07c *63/02*
U.S. Cl. 260—524 R 16 Claims

A process for the oxidation of mono nuclear aromatic compounds having at least one methyl nuclear substituent in the presence of oxygen, cobaltous or cobaltic ion, at 60° C. to 150° C. and atmospheric pressure or greater, and characterized by the addition of an initiator at the period of maximum oxygen uptake in the course of reduction. The use of particular cocatalysts such as zirconium, columbium, and lanthanum is contemplated.

3,607,920

PROCESS FOR THE PREPARATION OF HIGH PURITY ISOMERS OF TOLUIC ACID

Allan Pennington Clark, Camillus, N.Y., assignor to Cowles Chemical Company, Cleveland, Ohio

Filed Oct. 20, 1967, Ser. No. 676,932
Int. Cl. C07c *51/42*, *63/02*
U.S. Cl. 260—524 R 6 Claims

The preparation of high purity isomers of toluic acid by catalytic oxidation of the corresponding xylene isomer followed by introduction of a hot, concentrated solution of the oxidation-product to a cooled, moving slurry of the corresponding toluic acid crystals at a controlled concentration to produce supersaturation and thereafter crystallizing the desired toluic acid and recovery thereof is disclosed.

3,607,921
CATALYTIC PURIFICATION OF TEREPHTHALIC ACID
Arnold F. Stancell, Highland, and Clairborne A. Duval, Jr, Westfield, both of N.J., assignors to Mobil Oil Corporation
Filed June 12, 1968, Ser. No. 736,252
Int. Cl. C07c *51/42*
U.S. Cl. 260—525 **16 Claims**

Crude terephthalic acid is purified at elevated temperatures by contact in the presence of carbon monoxide with solid particles of an adsorptive agent having substantial carbon monoxide sorption capacity (e.g., palladium on a carbon support) to obtain a high recovery of the purified acid while effecting a high percentage conversion of the small amounts of para-carboxybenzaldehyde contaminating the crude acid. In at least some instances, small amounts of hydrogen may be charged to increase the catalyst life; and steam or another inert gaseous carrier is desirably employed in vapor phase operations.

3,607,922
CATALYTIC OXIDATION OF GLUCOSE
Garry J. K. Acres, and Anthony E. R. Budd, both of London, England, assignors to Johnson, Matthey & Co., Limited, London, England
Filed Oct. 9, 1967, Ser. No. 673,947
Claims priority, application Great Britain, Oct. 13, 1966, 45735/66
Int. Cl. C07c *51/26*
U.S. Cl. 260—528 **10 Claims**

This invention relates to the oxidation of glucose to gluconic acid or glucosaccharic acid. An aqueous solution of glucose containing an alkali (the carbonates or bicarbonates of sodium and potassium) is contacted with an oxygen-containing gas in a trickle column reactor in the presence of a supported platinum group metal catalyst.

3,607,923
PROCESS FOR PREPARING DIBASIC ACIDS
Charles Nathan Winnick, 491 Palmer Ave., Teaneck, N.J.
Filed Mar. 21, 1968, Ser. No. 714,758
Int. Cl. C07c *51/28, 55/04*
U.S. Cl. 260—531 R **12 Claims**

This invention relates to a process for preparing dibasic acids from the corresponding cycloalkytriene by epoxidation of this latter compound to the corresponding epoxydiene and converting this compound to a derivative oxidizable to the dibasic acid.

3,607,924
PROCESS FOR THE PREPARATION OF GLYOXYLIC ACID
Jacques Boichard; Bernard Pierre Brossard; Michel Louis Marie Joseph Gay, and Raymond Marc Clement Janin, all of Lyon, France, assignors to Rhone-Poulenc S. A.
Filed Sept. 15, 1966, Ser. No. 579,521
Claims priority, application France, Sept. 22, 1965, May 11, 1966, 32310;61181
Int. Cl. C07c *59/30*
U.S. Cl. 260—533 R **8 Claims**

Glyoxylic acid is produced in good yield by oxidizing ethylene with 10 to 14.5 percent aqueous nitric acid.

3,607,925
PROCESS FOR THE PREPARATION OF ACETIC ACID
Jacques Boichard, Irigny, Rhone; Bernard Brossard, Lyon, Rhone; Michel Gay, Lyon, Rhone, and Raymond Janin, Lyon, Rhone, all of France, assignors to Rhone-Poulenc S. A., Paris, France
Filed Sept. 25, 1968, Ser. No. 762,561
Claims priority, application France, Sept. 26, 1967, 122338
Int. Cl. C07c *53/08*
U.S. Cl. 260—533 R **8 Claims**

Acetic acid is made by oxidizing but-2-ene with nitric acid in the presence of a vanadium catalyst.

3,607,926
DICARBOXYLIC ACID MANUFACTURE
Richard D. Smetana, Beacon, N.Y., assignor to Texaco Inc., New York, N.Y.
Filed Mar. 18, 1969, Ser. No. 808,349
Int. Cl. C07c *55/12, 55/14*
U.S. Cl. 260—533 C **9 Claims**

A method of producing alkanedioic acid of from 3 to 9 carbons comprising contacting in an oxidation zone a cycloalkane of from 3 to 9 carbons with a mixture comprising ozone and at least about 100 wt. percent nitric acid to form a two-phase reaction mixture containing said dioic acid and recovering said dioic acid by withdrawing said mixture to a separation zone, recycling the upper cycloalkane layer in the separation zone to the reaction zone and recovering said dioic acid from the lower layer in said separation zone, concentrating the nitric acid and byproducts in the residual lower layer for reuse in said oxidation zone.

3,607,927
PROCESS FOR THE OXIDATION OF ALKENES TO UNSATURATED ACIDS AND ALDEHYDES USING A SILVER CADMIUM CATALYST
Alvin B. Stiles, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation-in-part of application Ser. No. 596,817, Nov. 25, 1966, now Patent No. 3,489,787, which is a continuation-in-part of application Ser. No. 293,156, July 5, 1963, now Patent No. 3,334,143, dated Aug. 7, 1967, which is a continuation-in-part of application Ser. No. 2,802, Jan. 18, 1960, now abandoned. This application June 19, 1969, Ser. No. 834,890
Int. Cl. C07c *57/04*
U.S. Cl. 260—533 N **4 Claims**

Unsaturated aldehydes, unsaturated acids, or mixtures thereof are prepared in good yield from alkenes having 3–4 carbon atoms using a nonporous silver-cadmium alloy catalyst containing 1% to 15%, by weight of cadmium.

3,607,928
PROCESS FOR THE PREPARATION OF METHIONINE SULFOXIMINE
Albert William Lutz, and Richard Joseph Magee, both of Princeton, N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Oct. 3, 1967, Ser. No. 672,446
Int. Cl. C07c *101/00*
U.S. Cl. 260—534 S **6 Claims**

An improved process for the preparation of methionine sulfoximine which comprises reacting methionine sulfoxide with an alkali metal azide at temperatures of 25° to 50° C., in the presence of sulfuric acid containing essentially no free water in the absence of immiscible organic solvents.

3,607,929
INCREASING THE OPTICAL PURITY OF L-LYSINE MONOHYDROCHLORIDE
Albertus H. Pecasse; Jentje Bonnema, and Gerardus A. Geurts, all of Geleen, Netherlands, assignors to Stamicarbon N. V., Heerlen, Netherlands
Filed Jan. 3, 1968, Ser. No. 695,360
Claims priority, application Netherlands, Jan. 11, 1967, 6700368
Int. Cl. C07c *99/12, 101/24*
U.S. Cl. 260—534 **6 Claims**

A process for the purification of optically active lysine monohydrochloride, containing racemic lysine monohydrochloride as an optical impurity, is disclosed. In this process the solid salt is treated with water to effect an at least partial dissolution or extraction of the optical antipod of the lysine monohydrochloride which is present in the original salt. The aqueous solution thus formed is separated from the solid phase before an equilibrium state is reached, the solid

phase thus obtained being of lower optical purity than the original salt.

3,607,930

CONTINUOUS PRODUCTION OF ALKALI METAL SALTS OF NITRILOTRIACETIC ACID

Christoph Berding, Limburgerhof, Pfalz; Paul Guenthert, Iggelheim, Pfalz; Waldemar Koehler, Ludwigshafen (Rhine), and Gerhard Schulz, Ludwigshafen (Rhine), all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed July 8, 1968, Ser. No. 743,221
Int. Cl. C07c *101/20*
U.S. Cl. 260—534 E 4 Claims

A continuous process for the production of alkali metal salts of nitrilotriacetic acid by reaction in a first stage of alkali metal cyanide, formaldehyde and excess ammonia at superatmospheric pressure and elevated temperature to form an aminoacetic acid solution, followed by depressurizing and treating the solution obtained with further amounts of alkali metal cyanide and formaldehyde while removing the ammonia formed until conversion to nitrilotriacetic acid is complete.

3,607,931

METHOD FOR THE MANUFACTURE OF THE DISODIUM SALT OF ETHYLENEDIAMINETETRAACETIC ACID

James Hegarty, Nashua; Jon Thunberg, Milford, and Corbet Johnson, Nashua, all of N.H., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of application Ser. No. 716,003, Mar. 26, 1968, now abandoned , which is a continuation-in-part of application Ser. No. 660,135, Aug. 11, 1967, now abandoned , which is a continuation of application Ser. No. 382,947, July 15, 1964, now abandoned. This application June 27, 1969, Ser. No. 837,345
Int. Cl. C07c *101/20, 101/26*
U.S. Cl. 260—534 E 4 Claims

A process for making partial salts of polycarboxylic polyamino acid chelating agent compounds characterized by forming a solution of a polyamino polycarboxylic acid salt adjusting it to a pH level above the normal pH of the salt which it is desired to produce, evaporating, and separating from the mother liquor the desired partial salt which crystallized first thereby salvaging a useful mother liquor, producing a crystalline partial salt of the chelating agent which has the characteristic of being capable of going into aqueous solution in subsequent use at a rate far greater than partial salts prepared by conventional neutralization technique.

3,607,932

BLACK PIGMENT DYES OBTAINED BY REACTION OF CITRIC ACID OR SALTS THEREOF WITH UREA AND FORMAMIDE

Peter Dimroth, Ludwigshafen, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Aug. 27, 1969, Ser. No. 853,494
Claims priority, application Germany, Sept. 9, 1968, P 17 94 105.8
Int. Cl. C07c *59/16*
U.S. Cl. 260—535 R 1 Claim

Black pigment dyes obtained by reaction of citric acids or salts of citric acid with urea and formamide at from 100° to 250° C.

3,607,933

PREPARATION OF OMEGA-HALOALKANOIC ACIDS

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Oct. 28, 1968, Ser. No. 771,345
Int. Cl. C07c *53/20, 53/30*
U.S. Cl. 260—539 R 4 Claims

Omega-haloalkanoic acids are produced by the reaction of a hydrogen halide, water and an omega-cyanoalkyl carboxylate.

3,607,934

PROCESS FOR THE MANUFACTURE OF CHLOROPHOSPHINES

Otto Bretschneider, Bonn-Venusbert; Heinz Harnisch, Weiden-Lovenich, and Werner Klose, Knapsack near Cologne, all of Germany, assignors to Knapsack Aktiengesellschaft, Knapsack, near Cologne, Germany

Filed Sept. 8, 1967, Ser. No. 666,494
Claims priority, application Germany, Sept. 17, 1966, K 60275
Int. Cl. C07f *9/34*
U.S. Cl. 260—543 P 14 Claims

Hydrocarbon-substituted chlorophosphines of the general formula $R_nP(Cl)_{3-n}$ in which R stands for a hydrocarbon radical having 1 to 3 carbon atoms and *n* stands for 1 or 2 are produced by reaction of phosphorus in vapor or gas form with a hydrocarbon chloride in gas or vapor form in the presence of active carbon as the catalyst.

3,607,935

SULFONYL-UREAS AND A PROCESS FOR PREPARING THEM

Hans Hilmer; Gerhard Korger; Rudi Weyer, and Walter Aumuller, all of Frankfurt am Main, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft Vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

Filed July 25, 1958, Ser. No. 750,887
Claims priority, application Germany, July 31, 1957, F 23664
Int. Cl. C07c *127/16*
U.S. Cl. 260—553 D 3 Claims

This invention relates to antidiabetic sulfonylureas of the general formula

$$R—SO_2—NHCONH—CH_2—CH_2—SH$$

$$(R—SO_2—NHCONH—CH_2—CH_2—S—)_2$$

wherein R is phenyl or substituted phenyl, cycloalkyl or cycloalkyl-alkyl of 6–7 carbon atoms which have a good blood sugar lowering effect.

The above mercapto derivatives are made by reaction of the appropriate sulfonylurethanes, sulfonylisocyanates, or N-sulfonyl-N-acyl ureas with cystamine, which mercapto derivatives can be further oxidized to the disulfide compounds shown above.

3,607,936

PRODUCTION OF NITRILOTRISPROPIONIC UREIDE,

Franz Merger Ludwigshafen, Germany, assignor to Badische Anilin- & Soda- Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Dec. 27, 1968, Ser. No. 787,625
Claims priority, application Germany, Dec. 29, 1967, P 16 43 726.6
Int. Cl. C07c *27/00*
U.S. Cl. 260—553 E 1 Claim

Production of nitrilotrispropionic ureide by reaction of acrylic ureide with ammonia, and the new nitrilotrispropionic ureide itself which is a stabilizer for polyformaldehyde and a valuable starting material for the production of textile auxiliaries, synthetic resins and antistatic agents in the textile and plastics fields.

3,607,937

TWO-STAGE UREA SYNTHESIS

Eiji Otsuka; Kazumichi Kanai, and Tadao Sakai, all of Fujisawa, Japan, assignors to Mitsui Toatsu Chemicals Incorporated, Tokyo, Japan

Filed June 26, 1968, Ser. No. 740,114
Int. Cl. C07c 127/00
U.S. Cl. 260—555 A 8 Claims

Two-stage synthesis of urea comprising synthesizing urea in a first urea synthesis zone without recycle of the unreacted starting materials, separating the unreacted starting material from the resulting synthesis effluent, absorbing the unreacted starting material separated into an absorbent, subjecting to the resulting absorbate to the distillation at a pressure in a second urea synthesis zone and utilizing the unreacted starting material separated by the distillation in the second urea synthesis zone.

3,607,938

PROCESS FOR THE SYNTHETIC MANUFACTURE OF UREA FROM AMMONIA AND CARBON DIOXIDE

Wilhelm F. Braun, Lucerne, Switzerland, assignor to Chemical Construction Corporation, New York, N.Y.

Filed May 17, 1968, Ser. No. 730,111
Claims priority, application Switzerland, May 22, 1967, 7182/67
Int. Cl. C07c 127/00
U.S. Cl. 260—555 A 19 Claims

A process is provided for the synthetic manufacture of urea from ammonia and carbon dioxide, in which the ammonium carbamate contained in the urea synthesis effluent stream is stripped and separated in mixed off-gas and returned to the synthesis reactor. The stripping of the carbamate takes place using previously separated mixed off-gas which is carried in a cycle to the heated stripping zone. A feed gas component which may be ammonia or carbon dioxide is also introduced into the zone, so that the total stripping proceeds either in one stage with ammonia or carbon dioxide addition, or in two stages, with the synthesis effluent stream being divided into two portions which flow in parallel to the separate stages. In the first stage, ammonia is added for stripping, and in the second stage carbon dioxide is added. An amount of at least 40 percent of the synthesis effluent stream is admitted to the first decomposition and stripping stage which operates at synthesis pressure, and a mixture consisting of the remainder of the synthesis effluent stream and the solution flowing from the first stage is added to the second stage, which may be operated at reduced pressure.

3,607,939

PREPARATION OF UREA IN COMBINATION WITH THE SYNTHESIS OF AMMONIA

Petrus J. C. Kaasenbrood, Sittard, and Gerardus J. J. M. Taks, Geleen, both of Netherlands, assignors to Stamicarbon N.V., Heerlen, Netherlands

Filed Dec. 23, 1968, Ser. No. 785,971
Int. Cl. C07c 127/00
U.S. Cl. 260—555 A 3 Claims

A process for the manufacture of urea from ammonia and carbon dioxide is described with particular reference to procedures in handling the ammonia feed to the urea reactor whereby the volume of inert gases in said reactor is reduced without need for condensation and liquefication of the ammonia synthesis gas. The technique described involves absorbing the ammonia from the ammonia synthesis gas mixture (containing ammonia, hydrogen and nitrogen) in water, a dilute aqueous solution of urea, or a dilute aqueous solution of ammonia and carbon dioxide at a relatively high pressure (250 atm. or more) and then delivering the absorbed ammonia solution to the urea plant—this technique being practiced so that only a relatively small amount of additional water (over and above that autogenously formed in the urea reaction itself) is introduced into the urea reactor.

3,607,940

β-ALIPHATICAMINOPROPIONAMIDES

Eugene J. Miller, Jr., Wheaton; Harlan E. Tiefenthal, Western Springs; Steven C. Ducey, Broadview, and Frederick S. Marsh, Chicago, all of Ill., assignors to Armour Inustrial Chemical Company

Filed Aug. 28, 1967, Ser. No. 663,520
Int. Cl. C07c 103/18
U.S. Cl. 260—561 6 Claims

β-aliphaticaminopropionamides having a secondary-alkyl group prepared by the reaction of a secondary-alkyl amine or diamine with acrylamide providing a superior product for uses such as hot melt wax adhesive slip agents and as settling agents for particulate suspensions in hydrocarbon systems.

3,607,941

2-(LOWER-ALKOXY)-2-PHENYLALKANAMIDOXIMES

Denis M. Bailey, E. Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed June 27, 1968, Ser. No. 740,473
Int. Cl. C07c 123/00
U.S. Cl. 260—564 G 5 Claims

A 2-(lower-alkoxy)-2-phenylalkanamidoxime, having hypoglycemic activity, is prepared by reacting a 2-(lower-alkoxy)-2-phenylalkanenitrile with hydroxylamine. The intermediate 2-(lower-alkoxy)-2-phenylalkanenitrile is prepared preferably by first reacting a benzaldehyde with a tri-(lower-alkyl) orthoformate to form the aldehyde di-(lower-alkyl) acetal, reacting the latter with an acyl halide to form the corresponding a-halobenzyl lower-alkyl ether and reacting said ether with an alkali cyanide to yield said intermediate nitrile.

3,607,942

SYNTHESIS OF 1-HYDROXY-4-KETO-α-IONONE

Ralph Lawrence Rowland, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 8, 1968, Ser. No. 727,691
Int. Cl. C07c 49/60
U.S. Cl. 260—587 3 Claims

Air oxidation of 4-keto-α-ionone on solid surfaces to produce 4-(1-hydroxy-4-oxo-2,6,6-trimethyl-2-cyclohexene-1-yl)-3-butene-2-one.

3,607,943

PREPARATION OF PYRUVALDEHYDE

John S. Warner, Columbus, Ohio, assignor to Wm. Wrigley Jr. Co., Chicago, Ill.

Filed Mar. 21, 1968, Ser. No. 714,793
Int. Cl. C07c 49/04
U.S. Cl. 260—593 9 Claims

A process for the preparation of pyruvaldehyde which comprises the gradual addition of an aqueous solution of dihydroxyacetone to a water-immiscible organic liquid maintained at a temperature of about 100° C. to about 200° C. in the presence of an acidic catalyst and collecting the pyruvaldehyde produced. Suitable acidic catalysts include sulfuric acid, para-toluene sulfonic acid, acidic ion exchange resins, phosphoric acid and potassium acid sulfate.

3,607,944

SOME BIS(HALOMETHYL)-PHOSPHORYLMETHYLTRIPHENYLPHOSPHONIUM HALIDES AND A STABLE PHOSPHINE METHYLENE

Donald J. Daigle, New Orleans; Leon H. Chance, New Orleans, and George L. Drake, Jr., Metairie, all of La.

Filed Aug. 29, 1969, Ser. No. 854,326
Int. Cl. C07f 9/54; C09k 3/28
U.S. Cl. 260—606.5 F 6 Claims

The 1:1 triphenylphosphine adducts of tris(chloromethyl)-phosphine oxide, tris(bromomethyl)phosphine oxide, and tris(iodomethyl)phosphine oxide were prepared. The chloro derivative was converted to triphenylphosphine bis(chloromethyl)phosphorylmethylene by reaction with aqueous am-

monium hydroxide. These phosphorus compounds are useful as flame retardants for cellulosic materials.

3,607,945

HYDROCARBYLTHIOALKANETHIOLS

Jack E. Reece, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Dec. 4, 1968, Ser. No. 781,239
Int. Cl. C07c *149/06, 9/12*
U.S. Cl. 260—609 A 4 Claims

Hydrocarbylthioalkanethiols, e.g., 6-(t-butylthio)-1-hexanethiol, are prepared by the reaction of hydrocarboncarbothiolic acids, e.g., thiolacetic acid, with hydrocarbylthioalkenes, e.g., 6-(t-butylthio)-1-hexene, to provide hydrocarbylthioalkyl hydrocarbonthiolates, e.g., 6-(t-butylthio)-1-hexyl methanecarbothiolate, followed by conversion with a base to provide said thiols. The hydrocarbythioalkanethiols are useful as chain transfer agents in the polymerization of monomers to form polymers, such as elastomers and the like.

3,607,946

PRODUCTION OF TECHNICALLY PURE 2,6-DIMETHYLANISOLE

Erich Behr, Troisdorf, and Gunter Meyer, Oberlar, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of application Ser. No. 721,609, Apr. 16, 1968, now abandoned. This application May 11, 1970, Ser. No. 37,408
Claim priority, application Germany, May 17, 1967, D 53104
Int. Cl. C07c *43/20*
U.S. Cl. 260—612 D 1 Claim

Process for preparing technically pure 2,6-dimethylanisole comprising reacting 2,6-dimethylphenol and methyl chloride in an alkaline, aqueous medium at a temperature of from 20 to 100° C. and a pressure of up to 15 atmospheres gauge and thereafter separating the 2,6-dimethylanisole by steam distillation from an alkaline solution.

3,607,947

1,2-BIS [P-(HYDROXYBENZYL) PHENOXY] ETHANE

John Penfold, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 10, 1968, Ser. No. 735,553
Claims priority, application Great Britain, June 15, 1967, 27734/67
Int. Cl. C07c *39/12*
U.S. Cl. 260—613 R 1 Claim

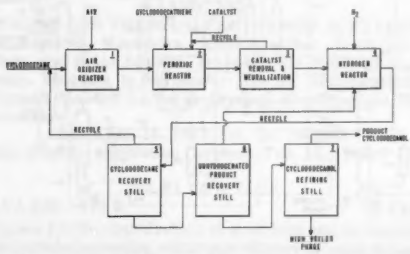
Preparation of the polyphenol, 1,2-bis [P-(hydroxybenzyl)Phenoxy] ethane, and the reaction of said polyphenol with formaldehyde to prepare a resole from which are prepared resin forms.

3,607,948

PREPARATION OF CYCLODODECANOL

Donald Eldon Welton, Victoria, Tex., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 16, 1968, Ser. No. 706,018
Int. Cl. C07c *35/02, 51/28*
U.S. Cl. 260—617 C 8 Claims



A process for the preparation of a cyclic alcohol by air oxidation of a cycloaliphatic compound to a mixture containing 1–30 percent by weight cycloaliphatic hydroperoxide, oxidizing cycloolefin by means of the cycloaliphatic hydroperoxide, hydrogenating the resulting product, and recovering cyclic alcohol and unconverted cycloaliphatic compound for recycle.

3,607,949

PRODUCTION OF 2,2'-METHYLENEBIS (3,4,6-TRICHLOROPHENOL)

Thomas F. Cleary, Summit, N.J., assignor to Centerchem, Inc., New York, N.Y.

Filed Feb. 10, 1969, Ser. No. 798,146
Int. Cl. C07c *39/16*
U.S. Cl. 260—619 4 Claims

This invention is directed to the production of 2,2'-methylenebis (3, 4, 6-trichlorophenol), commonly known as hexachlorophene, by reacting 1 mol of 2, 4, 5-trichlorophenol, 1 mol of 2, 4, 5-trichlorophenylsulfate and 1 mol of formaldehyde in a solvent solution in which the 2, 4, 5-trichlorophenylsulfate has been prepared in situ by reacting 2, 4, 5-trichlorophenol with sulfurtrioxide.

3,607,950

PRODUCTION OF 2,6-DIMETHYL-3,4-DIHALOPHENOLS

Rolf Platz, Mannheim, and Franz Merger, Ludwigshafen am Rhine both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed May 13, 1968, Ser. No. 728,842
Claims priority, application Germany, May 13, 1967, P 12 92 661.3
Int. Cl. C07c *39/26*
U.S. Cl. 260—623 4 Claims

The production of 2,6-dimethyl-3,4-dihalophenols by reaction of 2,6-dimethyl-4-tertiary-butylphenol with sulfuryl halides. The new products of the process are valuable starting materials for the production of fungicides and bactericides.

3,607,951

PROCESS FOR PREPARING 1.4-DIBROMO-2-BUTANOL

Lars Andersen, N. Hesperiagatau 7 A, Helsinki, Finland, assignor to OY Medica AB, Helsinki, Finland

Filed Feb. 9, 1968, Ser. No. 704,244
Claims priority, application Finland, Feb. 28, 1967, 586/67
Int. Cl. C07c *31/34*
U.S. Cl. 260—633 8 Claims

A process for preparing 1.4-dibromo-2-butanol from allyl bromide, including the steps of treating allyl bromide with formaldehyde in the presence of an acid catalyst and a solvent, and treating the resulting diol with hydrogen bromide to obtain the dibromobutanol product. The latter is an intermediate in the production of pyrrolidine derivatives.

3,607,952

PROCESS FOR PREPARATION OF HEXAFLUOROISOPROPANOL

Kung Hsing Lee, Wilmington, Del., assignor to E.I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 28, 1969, Ser. No. 811,668
Int. Cl. C07c *31/34*
U.S. Cl. 260—633 7 Claims

A process for reducing hexafluoroacetone to hexafluoroisopropanol with hydrogen and a noble metal containing reduction catalyst in the presence of a hexafluoroisopropanol reaction diluent, using hydrogen pressure of 10 to 50 atm., and catalyst concentrations of from about 0.1% to 1.0% based on the weight of hexafluoroacetone used.

3,607,953

PROCESS FOR PRODUCTION OF 2,2-BIS(HALOMETHYL)-1,3-PROPANEDIOL FROM PENTAERYTHRITOL

Edward Hurley, Jr., Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Apr. 7, 1969, Ser. No. 814,150
Int. Cl. C07c *31/34*
U.S. Cl. 260—633 8 Claims

Production of 2,2-(Halomethyl)-1,3-propanediol by reacting pentaerythritol with anhydrous HBr or HCl in the presence of N-alkylpyrrolidone in which the alkyl groups contain from one to about six carbon atoms is taught. The process is also applicable to the production of the corresponding di-products from di-pentaerythritol.

3,607,954

3,3′ DINITRO-OCTAFLUOROBIPHENYL

Leon Jerzy Belf, Avonmouth, and David Thomas Saggers, Saffron Walden, Essex, both of England, assignors to Imperial Smelting Corporation (N.S.C.) Limited, London, England

Filed Jan. 24, 1969, Ser. No. 793,916
Claims priority, application Great Britain, Jan. 29, 1968, 4539/68
Int. Cl. C07c *79/12*
U.S. Cl. 260—646 4 Claims

The new compound 3,3′-dinitro-octafluorobiphenyl is prepared (e.g. by nitration of the corresponding dihydro-compound or biphenyl linking of the 3-bromo 2,4,5,6-tetrafluoronitrobenzene with copper bronze) and formulated into antifungal compositions.

3,607,955

HYDROFLUORINATION AND DEHYDROFLUORINATION AND CATALYSTS THEREFOR

Lloyd E. Gardner, Bartlesville, Okla., assignor to Phillip Petroleum Company

Division of Ser. No. 398,442, Sept. 22, 1964, Pat. No. 3,413,369. Filed Apr. 8, 1968, Ser. No. 719,712
Int. Cl. C07c *21/18, 17/34*
U.S. Cl. 260—653.5 4 Claims

Hydrofluorination and dehydrofluorination reactions are accomplished over a catalyst bed formed by heating a bed of particles of porous alumina to a temperature of at least 220° F. and flowing therethrough a gaseous mixture of HF and an inert diluent until the hot zone of chemical reaction has passed completely through said bed.

3,607,956

PROCESS FOR PREPARING ALLYL CHLORIDE AND METHALLYL CHLORIDE

Lothar Hornig; Horst Grosspietsch, and Gunter Mau, all of Frankfurt am Main, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister, Lucius & Bruning, Frankfurt am Main, Germany

Continuation of application Ser. No. 667,640, Sept. 14, 1967, now abandoned. This application Mar. 27, 1970, Ser. No. 20,876
Claim priority, application Germany, Sept. 23, 1966, F 50273.
Int. Cl. C07c *21/04*
U.S. Cl. 260—654 A 10 Claims

Preparation of allyl chloride or methallyl chloride by reaction of oxygen with (a) propylene or isobutylene and hydrogen chloride or (b) a monochloropropane or monochlorisobutane in the presence of a catalyst containing (1) tellurium and/or compounds thereof, (2) basic nitrogen compounds or salts thereof and (3) vanadium, molybdenum or tungsten or compounds thereof.

3,607,957

TRICHLOROETHYLENE AND DICHLOROETHYLENES PREPARED BY OXYCHLORINATION

Albert Antonini, Paris; Claude Kaziz, La Courneuve, and Georges Wetroff, Le Thillay, all of France, assignors to Produits Chimiques Pechiney-Saint-Gobain, Paris, France

Filed May 20, 1968, Ser. No. 730,664
Claims priority, application France, May 19, 1967, 106978
Int. Cl. C07c *17/06, 21/10*
U.S. Cl. 260—654 A 15 Claims

Process for preparation of trichloroethylene and dichloroethylenes by oxychlorination with a fluid bed catalyst of C_2 chlorinated ethylenic derivatives such as vinylidene chloride, dichloroethylenes and possibly vinyl chloride.

3,607,958

BROMINATION PROCESS

Robert Leitch Forman, and Reuben Rowlands, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 4, 1966, Ser. No. 591,963
Claims priority, application Great Britain, Nov. 18, 1965, 49,079/65
Int. Cl. C07c *17/10, 19/00*
U.S. Cl. 260—658 R 13 Claims

Bromination of paraffinic hydrocarbons containing from 8 to 22 carbon atoms or chlorinated derivatives thereof using a mixture of liquid bromine and chlorine in the presence of a free radical catalyst.

3,607,959

CATALYST FOR HYDROCARBON CONVERSION

John Estes, Wappingers Falls; Robert M. Suggitt, Fishkill, and Stanley Kravitz, Wiccopee, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed June 16, 1967, Ser. No. 646,455
Int. Cl. C07c *3/00, 3/50*
U.S. Cl. 260—671 10 Claims

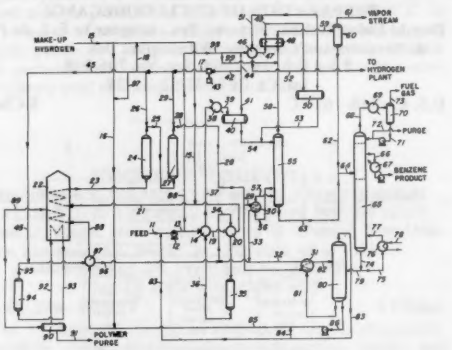
This invention relates to a method of preparing a catalyst useful in hydrocarbon conversion such as alkylation and polymerization. More particularly, this invention relates to the polymerization of polymerizable hydrocarbons e.g. propylene and the alkylation of alkylatable hydrocarbons e.g. benzene in the presence of an alumina catalyst activated with an organic species having at least two carbon atoms per molecule, and chlorine or bromine in suitable proportions, or with a mixture of multicarbon activators and chlorine and bromine.

3,607,960

THERMAL HYDRODEALKYLATION PROCESS

Delbert L. Button, Allison Park, Pa., and Lawrence J. Kirby, Tokyo, Japan, assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of application Ser. No. 723,998, Apr. 25, 1968, now abandoned. This application June 18, 1970, Ser. No. 47,586
Int. Cl. B01d *3/06;* C07c *3/58;* C10q *9/16*
U.S. Cl. 260—672 NC 8 Claims



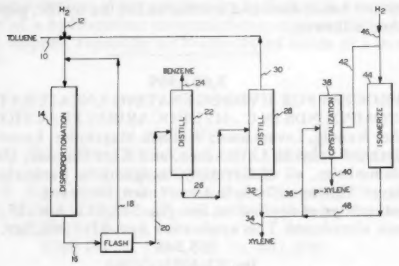
In a process for the thermal hydrodealkylation of an alkyl aromatic, such as toluene, to produce benzene, a mixture of

diphenyls and high-boiling polymers is separated as bottoms from the effluent of a primary hydrodealkylation zone. This mixture is mixed with recycle hydrogen and flash vaporized, the vapor comprising polyphenyls and hydrogen being passed to an auxiliary reactor wherein the polyphenyls are converted to benzene. The flash vaporization selectively rejects substantially all of the high-boiling polymer compounds which would otherwise tend to form coke in the auxiliary reactor.

3,607,961
ALKYL TRANSFER OF ALKYL AROMATICS WITH GROUP VIII METALS ON BORIA-ALUMINA

Stephen M. Kovach, and Ronald A. Kmecak, both of Ashland, Ky., assignors to Ashland Oil & Refining Company, Houston, Tex.

Filed Dec. 19, 1968, Ser. No. 785,248
Int. Cl. C07c *3/58, 15/08;* **B01j** *11/06*
U.S. Cl. 260—672 R **17 Claims**



A process for the alkyl transfer of alkyl aromatics including contacting an alkyl aromatic feed material, such as toluene, with a catalyst comprising a Group VIII metal, such as nickel, platinum, or palladium and boria deposited on an alumina base at a temperature of about 800° to 1100° F., a pressure of about 0 to 2000 p.s.i.g., and a liquid hourly space velocity of about 0.1 to 10, and in the presence of hydrogen introduced at a rate of about 1 to 10 moles hydrogen per mole of hydrocarbon feed. Promoters selected from Group I, Group II, Group IV, and the Rare Earth metals of the Periodic System may be added to the catalyst. Deactivated catalyst may be periodically rejuvenated by discontinuing the introduction of aromatic feed material and purging with hydrogen and the catalyst can be reactivated by calcination in an atmosphere such as air. Where toluene is the feed, the alkyl transfer product may be distilled to separate benzene, toluene and xylenes, the toluene may be recycled to the alkyl transfer step, the xylenes may be crystallized to separate para-xylene from the remaining xylenes, the mother liquor from the crystallization step may thereafter be isomerized to readjust the para-xylene content and the product of the isomerization may be recycled to the crystallization zone.

3,607,962
PROCESS FOR THE MANUFACTURE OF ACETYLENE

Hans Krekeler, Wiesbaden; Klaus Gunther, Frankfurt am Main, and Heinz Schmitz, Frankfurt am Main, all of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft Vormals Meister, Lucius & Bruning, Frankfurt am Main, Germany

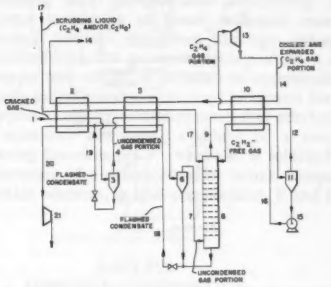
Filed Jan. 28, 1969, Ser. No. 794,808
Claims priority, application Germany, Feb. 28, 1968, P 16 68 102.0
Int. Cl. C07c *11/24*
U.S. Cl. 260—679 R **10 Claims**

Process for the manufacture of acetylene and its homologs by dehydrohalogenating dihalogen-alkanes or monohalogen-alkenes by means of alkaline earth metal oxides or alkaline earth metal hydroxides.

3,607,963
SEPARATION OF ACETYLENE AND ETHYLENE FROM CRACKED GAS

Axel Danneil, Ludwigshafen; Otto Nagel, Hambach; Rolf Platz, Mannheim, and Kurt Taglieber, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda- Fabrik Aktiengesellschaft, Ludwigshafen am Rhine Germany

Filed Feb. 10, 1969, Ser. No. 798,041
Claims priority, application Germany, Feb. 13, 1968, P 16 43 757.3
Int. Cl. F25j 3/02; **F25j** 3/06, 3/08
U.S. Cl. 260—679 **4 Claims**

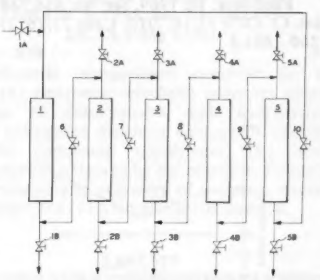


Joint separation of acetylene and ethylene from cracked gas, obtained by submerged-flame methods, by condensing the hydrocarbons in one or more stages by cooling to a temperature above the solidification temperature of acetylene in admixture with the other condensable constituents, separating the condensate, washing the residual gas mixture with liquid ethylene and/or ethane, and further cooling the gas mixture free from acetylene to −140° to −170° C.

3,607,964
METHOD FOR PRODUCING ISOPRENE AND APPARATUS THEREFOR

Kenji Naito, and Yoshio Kamatani, both of Osaka, Japan, assignors to Takeda Chemical Industries, Ltd.. Osaka, Japan

Filed Jan. 22, 1970, Ser. No. 4,959
Claims priority, application Japan, Jan. 23, 1969, 4886/69
Int. Cl. C07c *11/18, 1/20*
U.S. Cl. 260—681 **4 Claims**

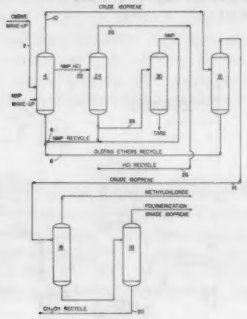


An improved method for the production of isoprene from the fixed vapor phase condensation of formaldehyde and isobutene which comprises housing a portion of the catalyst in each of a series of reaction chambers, the oldest being the terminal chamber. The said terminal chamber is replaced by adding a chamber housing fresh catalyst at the opposite end.

3,607,965
DIOLEFINS FROM CHLOROETHERS

John R. Coleman, Jr., Littleton; David W. Hall, Englewood, and Frank L. Dormish, Denver, all of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Sept. 25, 1969, Ser. No. 861,108
Int. Cl. C07c *1/20, 41/12*
U.S. Cl. 260—681 10 Claims



In the production of diolefins by reaction of a halo ether and an olefin followed by cracking hydrogen halide and alcohol from the intermediate adduct, olefin ethers are formed in the cracking reactor and are isolated by conventional distillation and recycled to the cracking reactor to be converted to diolefins and alcohol.

3,607,966
OXIDATIVE DEHYDROGENATION

Louis J. Croce, Seabrook, Tex., and Laimonis Bajars, Princeton, N.J., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

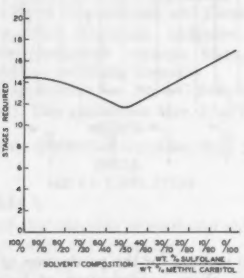
Filed Mar. 28, 1968, Ser. No. 716,986
Int. Cl. C07c *5/18*
U.S. Cl. 260—680 13 Claims

Compositions of matter comprising ferrites of magnesium, manganese, cobalt, nickel, zinc or cadmium modified with boron and a process of oxidative dehydrogenation by feeding oxygen to a reactor containing these compositions.

3,607,967
SOLVENT EXTRACTION OF ISOPRENE

Duane D. Shaul, Beaverton, Oreg., assignor to Phillips Petroleum Company

Filed Sept. 10, 1969, Ser. No. 856,748
Int. Cl. C07c *11/18, 7/10;* C10g *21/16, 21/22*
U.S. Cl. 260—681.5 5 Claims



A method of separating isoprene from isoamylenes by solvent extraction in which an isoprene-isoamylene stream is contacted with a solvent comprising sulfolane and methyl carbitol, the improvement comprising employing as the solvent about equal weight percentages of sulfolane and methyl carbitol in a mixture containing about 3.5 percent water.

3,607,968
ISOMERIZATION OF ALIPHATIC OLEFINS HAVING A TERMINAL DOUBLE BOND

Walter Schenk, Bad Duerkheim, and Hans Boehm, Speyer, both of Germany, assignors to Badische Anilin- & Soda-Fabrikaktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed June 23, 1970, Ser. No. 49,163
Claims priority, application Germany, July 12, 1969, P 19 35 504.5
Int. Cl. C07c *5/24*
U.S. Cl. 260—683.2 8 Claims

Isomerization of aliphatic olefins having terminal double bonds while retaining the carbon chain by isomerization of olefins having nine to 22 carbon atoms in the presence of a boron phosphate catalyst at elevated temperature. Isomerization mixtures according to the invention and their components are starting materials for the production of detergents and emulsifiers and auxiliaries for the textile, paper and leather industries.

3,607,969
PROCESS FOR HYDROGENATING UNSATURATED COMPOUNDS IN C_3-HYDROCARBON FRACTIONS

Walter Kronig, Leverkusen; Wilhelm Mayrhofer, Leverkusen; Gerhard Scharfe, Leverkusen, and Kurt Halcour, Cologne-Stammheim, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

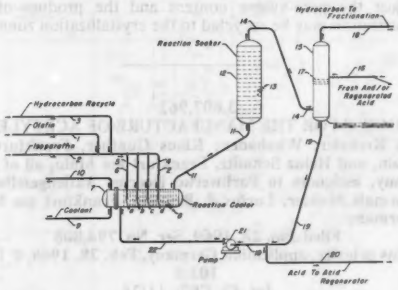
Continuation of application Ser. No. 545,553, Apr. 27, 1966, now abandoned. This application Apr. 11, 1969, Ser. No. 858,548
Int. Cl. C07c *5/04*
U.S. Cl. 260—683.9 3 Claims

Process for the complete saturation of a stream containing C_2 to C_4 hydrocarbons by hydrogenating such in a trickle phase over a fixed bed noble metal catalyst in the presence of a hydrogen atmosphere wherein about 0.3 to 3 parts of hydrogenation products per part of fresh feed are recycled in the process.

3,607,970
PROCESS FOR PRODUCING HIGH OCTANE ALKYLATED HYDROCARBONS SUBSTANTIALLY FREE OF ALKYL FLUORIDE COMPOUNDS

William B. Borst, Jr., Mount Prospect, Ill., assignor to Universal Oil Products, Company, Des Plaines, Ill.

Filed Apr. 25, 1969, Ser. No. 819,295
Int. Cl. C07c *3/54*
U.S. Cl. 260—683.48 9 Claims



Process for producing high-octane alkylated hydrocarbons substantially free of alkyl fluoride compounds utilizing a

hydrogen fluoride alkylation catalyst and a reactor system comprising a reaction cooler and a reaction soaker and a settler-contactor wherein the reactor soaker effluent is separated in the settler-contactor into a catalyst fraction and a fraction comprising high-octane alkylated hydrocarbons, unreacted hydrocarbons and alkyl fluoride compounds, the latter friction being contacted with concentrated hydrogen fluoride in the settler-contactor so that the alkyl fluoride compounds are reacted with the concentrated hydrogen fluoride.

3,607,971

POLYMERIZATION PROCESS FOR DODECANOLACTAM

Harry McGrath, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed May 6, 1968, Ser. No. 727,014
Claims priority, application Great Britain, May 10, 1967, 21665/67
Int. Cl. C08g *20/10*
U.S. Cl. 260—78 L **9 Claims**

Dodecanolactam is polymerized by heating with a catalytic amount of a hydrocarbon monosulphonic acid and if desired a chain stopper, especially an N-substituted amide of a stated formula.

3,607,972

ROOM TEMPERATURE VULCANIZABLE SILOXANE BLOCK COPOLYMER

James D. Kiles; Robert C. Hartlein, and Harold L. Vincent, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 1, 1969, Ser. No. 881,298
Int. Cl. C08g *47/00*
U.S. Cl. 260—825 R **18 Claims**

A room temperature vulcanizable siloxane block and a monoorganosiloxane block being endblocked with monoorganodiacetoxysiloxy units, monoorganodiketoximesiloxy units or monoorganodialkoxysiloxy units where the polydiorganosiloxane block is a mixture of polydiorganosiloxane blocks having 6 to 40 diorganosiloxane units per block and polydiorganosiloxane blocks having 200 to 500 diorganosiloxane units per block where the mixture has an average of from 25 to 460 diorganosiloxane units per block can be a resin or an elastomer, useful as caulking compounds, sealants, roof coatings, adhesives, optically clear compositions and low modulus compositions.

3,607,973

SATURATED LINEAR POLYMERS HAVING PENDANT POLYETHYLENIC UNSATURATION

Donald F. Holicky, Parma; Kenneth G. Hahn, Brookpark, and Robert C. Gasman, Parma, all of Ohio, assignors to SCM Corporation, Cleveland, Ohio

Filed Feb. 12, 1969, Ser. No. 798,769
Int. Cl. C08g *45/04, 15/00, 19/00*
U.S. Cl. 260—836 **14 Claims**

A class of polymers comprising a saturated linear ester-free backbone having pendant therefrom a plurality of ethylenically polyunsaturated groups which are polymerizable with vinyl monomer for thermosetting purposes under the influence of free radical catalysis is described, along with processes for preparing these polymers. The plurality of ethylenically polyunsaturated groups are attached to the linear polymer backbone through ester, ether, amine or amide linkage.

Linear polymers falling within the scope of this invention are advantageous in that when thermoset they produce shaped bodies or objects which have controlled physical properties (e.g., mechanical strength, rigidity or flexibility) and which also have increased chemical resistance to the action of solvents, acids and alkalis of shaped bodies or objects prepared from conventional polyester polymers. Additionally, cured films or products obtained from the polymers tend to be "uninhibited," that is the inhibition to cure of surfaces of films or articles is substantially reduced.

3,607,974

THERMOSETTING RESIN CONTAINING PENDANT UNSATURATION AND MONOMER WHERE MONOMER AND PENDENCY HAVE IDENTICAL FUNCTIONALITY

Donald F. Holicky, Parma; Kenneth G. Hahn, Brookpark, and Robert C. Gasman, Parma, all of Ohio, assignors to SCM Corporation, Cleveland, Ohio

Filed Feb. 11, 1969, Ser. No. 798,461
Int. Cl. C08g *45/04, 41/04;* **C08f** *15/00, 19/00*
U.S. Cl. 260—836 **6 Claims**

Thermosettable resin compositions comprising: (1) a linear copolymer consisting of linear saturated ester-free backbone having pendant therefrom through linkage F, where F is selected from the group consisting of ester, ether, isocyanate, amine and amide, a plurality of etylenically unsaturated groups polymerizable with vinyl monomer for thermosetting purposes, and (2) a copolymerizabel ethylenically unsaturated monomer containing residues of a saturated compound having functionality F′, where F′ is selected from the group consisting of a saturated ester, ether, isocyanate, amine, and amide wherein, in said composition, F and F′ are identical.

3,607,975

ADHESIVE COMPOSITION

Tomomichi Tsukada, Kawasaki-shi; Jiro Kano, Kawasaki-shi, and Tetuzo Nakai, Kawaguchi-shi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed May 16, 1968, Ser. No. 729,522
Claims priority, application Japan, June 9, 1967, Dec. 13, 1967, 42/36509;42/79492
Int. Cl. C08g *37/34*
U.S. Cl. 260—850 **9 Claims**

An adhesive composition which comprises a linear polyester-type polyethylene isophthalate, an amino compound containing an amino group of which a hydrogen atom is substituted by a functional methylol group, a curing catalyst and an oxide of a multivalent metal. When the adhesive composition is heated to cause curing, it will produce an adhesive layer having desirable physical properties of high-resistance to organic solvents and heat.

3,607,976

COMPOSITIONS FROM ISOCYANATE-TERMINATED POLYDIENES WITH ISOCYANATE-TERMINATED CYCLIC POLYETHERS AND ADIAMINE OR DIOL CHAIN EXTENDER

Henry L. Hsieh, and William R. Busler, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed Feb. 5, 1968, Ser. No. 702,793
Int. Cl. C08g *41/04*
U.S. Cl. 260—859 **9 Claims**

Novel polymeric compositions comprise the reaction product of (a) isocyanate-telechelic polymers obtained by the reaction of diisocyanates with hydroxy-telechelic polymers of conjugated dienes or conjugated diene/monovinyl aromatic compound copolymers; (b) isocyanate-telechelic polymers obtained by the reaction of diisocyanates with hydroxy-telechelic polymers of oxiranes, oxetanes, or tetrahydrofurans and (c) a simple diol or diamine.

3,607,977

BLOCK COPOLYMER COMPOSITIONS EXHIBITING ALTERED SURFACE ACTIVITY

Glenn L. Taylor, Palos Verdes; John W. Cotton, Mill Valley, and De Loss E. Winkler, Orinda, all of Calif., assignors to Shell Oil Company, New York, N.Y.

Filed Sept. 12, 1968, Ser. No. 759,521
Int. Cl. C08f *29/12*
U.S. Cl. 260—876 **3 Claims**

Block copolymer compositions are provided comprising a hydrocarbon block polymer containing at least three polymer

blocks one or more being of a monovinyl arene and one or more being of a conjugated diene or hydrogenated derivative of said polymers, combined with certain derivatized block copolymers characterized by their content of blocks compatible with the monovinyl arene blocks of the first block polymer and by their content of a second type of polymer block which is incompatible with the first named polymer block but may or may not be compatible with the conjugated diene polymer blocks of the first block polymer. These compositions are especially useful for such purposes as adhesion to polar surfaces, reduction in flammability, improvement in weatherability and other properties.

3,607,978

NITRILE POLYMERIC BLENDS

Yoon Chai Lee, and Quirino A. Trementozzi, both of Springfield, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 3, 1969, Ser. No. 788,911
Int. Cl. C08f *37/18, 41/12*
U.S. Cl. 260—876 R **9 Claims**

A polymeric blend is prepared from a nitrile polymer and a modifying polymer containing dicyanobutene-1. The modifying polymer greatly improves the processability of the nitrile polymer while maintaining or improving the barrier properties thereof, and products molded from the blends exhibit better optical characteristics than products similarly produced from the unmodified nitrile polymer.

3,607,979

HYDROPHILIC CHLOROSULFONATED BLOCK COPOLYMERS

De Loss E. Winkler, Orinda, Calif., assignor to Shell Oil Company, New York, N.Y.

Filed Oct. 24, 1968, Ser. No. 770,384
Int. Cl. C08f *19/04, 19/06*
U.S. Cl. 260—879 **8 Claims**

Block copolymers are provided which retain a high degree of elastomeric properties while at the same time exhibiting a large water absorption capacity are especially useful for water desalinization purposes. These block copolymers comprise chlorosulfonated derivatives of block polymers wherein the terminal polymer blocks are either polyvinyl arene blocks or polyvinyl cycloalkane blocks while the center blocks are hydrogenated conjugated diene blocks or alpha-olefin copolymer blocks of elastomeric character. The end blocks may also comprise alpha-olefin thermoplastic blocks. The chlorosulfonation is carried to an extent sufficient to impart a hydrophilic character to the polymers and is characterized by a sulfur content in the order of 1–10 percent by weight of the block copolymer.

3,607,980

METHOD OF POLYMERIZING VINYL CHLORIDE WITH ETHYLENE-VINYL ACETATE COPOLYMERS

Jean Claude Thomas, Lyon; Francis Fournel, Lyon, and Salomon Soussan, Saint-Fons, all of France, assignors to Produits Chimiques Pechiney-Saint-Gobain, Paris, France

Filed Nov. 2, 1967, Ser. No. 680,041
Claims priority, application France, Nov. 14, 1966, 83,489
Int. Cl. C08f *15/40, 15/24*
U.S. Cl. 260—878 R **8 Claims**

Resins of high shock resistance when shaped as tubes, rods, plates or the like are prepared by dissolving a copolymer of vinyl acetate and ethylene in liquid vinyl chloride, partly polymerizing another quantity of vinyl chloride with high turbulence in mass, mixing the solution of vinyl acetate-ethylene copolymer and the suspension of polyvinyl chloride in vinyl chloride, and subjecting this mixture to conditions of temperature, pressure, agitation and catalysis favorable to graft polymerization in mass of vinyl chloride on the vinyl acetate-ethylene copolymer.

3,607,981

NITRILE RUBBERS

Roger E. Morris, Cuyahoga Falls, Ohio, assignor to The B.F. Goodrich Company, New York, N.Y.

Filed Oct. 28, 1969, Ser. No. 871,953
Int. Cl. C08d *3/02*
U.S. Cl. 260—879 **5 Claims**

Improved nitrile rubbers that are readily processed, have an excellent balance of low temperature-oil swell properties and other good physical properties are prepared polymerizing a polar monomer as acrylonitrile or methacrylonitrile with a mixture of (1) an elastomer of a conjugated diene and a nitrile and (2) a polymer of a conjugated diene and a nitrile having a molecular weight below 20,000. This low molecular weight copolymer may also be liquid xanthate-, mercaptan- or carboxyl-terminated polymers.

3,607,982

HYDROXYLATED BLOCK COPOLYMERS OF BUTADIENE AND ISOPRENE

Deloss E. Winkler, Orinda, and Alfred W. Shaw, Moraga, both of Calif., assignors to Shell Oil Company, New York, N.Y.

Filed June 17, 1970, Ser. No. 47,124
Int. Cl. C08f *15/00, 19/00*
U.S. Cl. 260—880 **4 Claims**

Novel epoxidized block copolymers and novel hydroxylated products derived from them are prepared by epoxidation, and then hydrolysis, of conjugated diene block copolymers. In the selectively epoxidized polymers at least one highly (80–100 percent) epoxidized polymer block A, formed from a branched chain conjugated diene, is attached to at least one polymer block B, formed from a straight chain conjugated diene that is less than about 50 percent epoxidized. Hydroxylated products are prepared by acid hydrolysis of the epoxidized copolymers.

3,607,983

PROCESS FOR THE PRODUCTION OF HIGH IMPACT STRENGTH GRAFT POLYMERS

George L. Rushton, and Bobby Ray Martin, both of Trenton, N.J., assignors to Columbian Carbon Company, New York, N.Y.

Filed May 28, 1969, Ser. No. 828,709
Int. Cl. C08f *15/04, 1/13*
U.S. Cl. 260—880 R **10 Claims**

Processes are described for the preparation of synthetic resins by polymerizing a mixture of vinyl aromatic and vinyl cyanide monomers in the presence of a small particle size butadiene-styrene copolymer latex. Extruded sheets of this graft polymer product exhibit high impact strengths and possess scuff resistant matte finish surfaces which make them well suited for use in the manufacture of luggage.

3,607,984

IMPERMEABLE ELASTOMERS OF BUTYL RUBBER MIXED WITH A CONJUGATION DIENE POLYMER HAVING 40–90 PERCENT OF ITS DOUBLE BONDS IN A LATERAL POSITION

Jean-Marie Massoubre, Clermont-Ferrand, France, assignor to Compagnie Generale Des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand (Puy-de-Dome), France

Filed July 19, 1968, Ser. No. 746,038
Claims priority, application France, July 20, 1967, 115,078
Int. Cl. C08d *9/08*
U.S. Cl. 260—888 **5 Claims**

An impermeable elastomer which comprises a mixture of from about 50 percent to about 95 percent by weight of a butyl rubber and from about 50 percent to about 5 percent by weight respectively of a polymer of a conjugated diene having from about 40 percent to about 100 percent of its double bonds in a lateral position.

3,607,985

ELASTOMER HAVING IMPROVED BUILDING TACK

Robert Edward Tarney, Chadds Ford, Pa., and John J. Verbanc, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 30, 1968, Ser. No. 771,996
Int. Cl. C08d *9/08*
U.S. Cl. 260—889 10 Claims

An EDODM elastomer is tackified by uniformly mixing with a hydroxylated, carboxylated or phenolated isoprenoidal resin formed by copolymerization of isoprene with piperylene.

3,607,986

VINYL CHLORIDE-PROPYLENE COPOLYMER MODIFIED POLYPROPYLENE

Patrick W. Ager, West Chester, Pa., and Louis A. Graham, Greensboro, N.C., assignors to FMC Corporation, Philadelphia, Pa.

Filed Dec. 6, 1968, Ser. No. 781,974
Int. Cl. C08f *29/12*
U.S. Cl. 260—897 C 6 Claims

A polypropylene composition comprising polypropylene containing a minor amount of a vinyl chloride-propylene copolymer.

3,607,987

COATING COMPOSITION COMPRISING POLYETHYLENE AND A VISBROKEN COPOLYMER OF ETHYLENE AND PROPYLENE

Roger J. Walton, and Royce G. Cowan, both of Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed July 20, 1967, Ser. No. 654,683
Int. Cl. C08f *37/18*
U.S. Cl. 260—897 6 Claims

A coating composition comprising a blend of a thermally cracked copolymer containing a major amount of propylene and a low density homopolymer of ethylene and a coating method.

3,607,988

STEREOISOMERIC COMPLEX AS LIGHT-TRANSMISSIVE MEANS OF IMPROVED RESISTANCE TO RADIATION DAMAGE

Donald G. Gardner, Livermore, Calif., and George A. Henry, Kingston, Jamaica

Continuation of Ser. No. 538,914, Mar. 28, 1966, abandoned.
Filed Oct. 1, 1968, Ser. No. 764,211
Int. Cl. C08f *29/50*
U.S. Cl. 260—901 3 Claims

A solid polymer composition mixture of 60–75 percent syndiotactic polymer with 25–40 percent isotactic polymer produced from certain monomers of the type having an asymmetric structure and including polar substituent groups, and having improved resistance to radiation damage.

3,607,989

PROCESS FOR PREPARING CATIONIC POLYVINYLAROMATIC RESINS WITH IMPROVED COLOR

Lawrence F. Sonnabend, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 4, 1968, Ser. No. 773,309
Int. Cl. C08f *7/04, 27/03, 27/08*
U.S. Cl. 260—93.5 4 Claims

The color of cationic resins prepared by chloromethylation and amination of soluble, essentially linear polyvinylaromatic resins is improved by hydrogenation of the polyvinylaromatic resins to reduce the residual ethylenic unsaturation prior to chloromethylation. The resulting cationic resins are particularly useful in preparing electroconductive cellulose products.

3,607,990

PROCESS FOR THE MANUFACTURE OF PENTAERYTHRITOL PHOSPHITE HEPTANOATE

Silvio L. Giolito, Whitestone, and Walter Stamm, Tarrytown, both of N.Y., assignors to Stauffer Chemical Company, New York, N.Y.

Filed Nov. 22, 1967, Ser. No. 684,970
Int. Cl. C07d *105/04*; C08f *45/50*
U.S. Cl. 260—971 5 Claims

A process for manufacturing pentaerythritol phosphite heptanoate which comprises the step of reacting triphenyl phosphite with pentaerythritol to form an impure pentaerythritol phosphite intermediate. The impure pentaerythritol phosphite intermediate is then reacted with phenylheptanoate to form a crude pentaerythritol phosphite heptanoate in commercial yields. The end product can optionally be flash distilled to remove the impurities. The product of this process is known to be useful as a plasticizer for vinyl chloride and the like, and as an additive to lubricating oil base stocks to increase wear resistance.

3,607,991

PROCESS FOR PREPARING PHOSPHATE ESTERS

Willard D. Peterson, Pasadena, and Gilbert L. DuPertuis, La Habra, both of Calif., assignors to Kerr-McGee Corporation

Continuation-in-part of application Ser. No. 385,499, July 27, 1964. This application Mar. 21, 1968, Ser. No. 714,814
Int. Cl. C07f *9/08*
U.S. Cl. 260—973 10 Claims

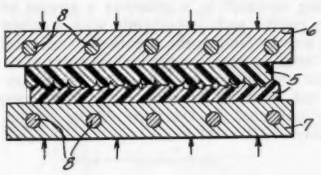
A process for preparing phosphorothioate and phosphorodithioate esters by reacting a Chloro-0, 0-dialkylphosphorothioate 0-dialkylphosphorothioate with an alkali metal salt of an organic compound which has a pKa value of from about 7 to 12, in the presence of a trimethylamine catalyst. The use of trimethylamine as the catalyst for the reaction enables the reaction to be carried out at relatively low temperatures, that is, between about 0° and 80° C., with the reaction being completed in a relatively short period of time.

3,607,992

METHOD OF MAKING ORNAMENTAL MATERIALS

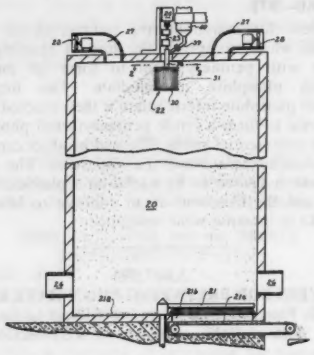
Arno H. Scheiding, Darien, Conn., assignor to L. E. Carpenter & Company, Wharton, N.J.

Filed Oct. 31, 1969, Ser. No. 871,215
Int. Cl. B29d *11/00, 7/14*
U.S. Cl. 264—1 4 Claims



Method of making ornamental sheet material having a moving highlight pattern, by forcing together contoured surfaces of two pressing members, each having an array of relief elements in its contoured surface, all elements of each array being of the same shape and size and arranged in intersecting rows, with the rows of one member at an angle to the rows of the other. At least one member is deformed in response to the pressure between the members. A permanent impression is made of the surface of the deformed member. This impression may be made in one of the members itself. This permanent impression may then be used as a master to form an embossing roll for reproducing the pattern defined by the deformation.

3,607,993
METHOD OF PRILLING
Malcolm H. Tuttle, 56 Avon Road, New Rochelle, N.Y.
Division of Ser. No. 531,658, Mar. 4, 1966, Patent No. 3,461,489. Filed May 20, 1969, Ser. No. 826,231
Int. Cl. B01j *2/04*
U.S. Cl. 264—8 **4 Claims**

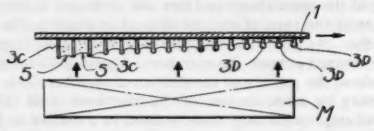


Prills are formed from molten material by expelling hot melt through sets of orifices drilled through the outer wall of a rotating centrifugal distributor on spaced horizontal planes and along lines which are related to the tangent, at the point of discharge, to the circle described by the distributor as it rotates through angles which differ in magnitude progressively from the upper to the lower portions of the distributor so that jets of hot melt are discharged from the distributor along sets of lines respectively slanted toward the direction of rotation at the uppermost plane of discharge and toward the other direction at the next lower plane of discharge, and at related speeds.

3,607,994
PROCESS FOR MAKING CAUSTIC SODA PELLETS
Janusz Jozef Henryk Krause, and Francis James Willson, both of Northwich, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Aug. 21, 1969, Ser. No. 852,089
Claims priority, application Great Britain, Sept. 18, 1968, 44402/68
Int. Cl. B01j *2/04*
U.S. Cl. 264—14 **3 Claims**

Caustic soda in the novel form of anhydrous small spheres of approximately 0.50 to 2.0 millimeters diameter is made by projecting upwards in a chamber a stream of molten anhydrous caustic soda cocurrently with a stream of ambient cooling air surrounding the stream of caustic soda, and allowing the latter on reaching the highest point of its trajectory to turn over and fall on the outside of the stream of ascending air to the base of the chamber, the temperature of the spheres collected at the base being above 90° C. and preferably 120° to 200° C.

3,607,995
METHOD FOR PRODUCING TERMINAL STRUCTURES
Yoshio Chiba, 1/8/2 Tennoji-machi, Abeno-Ku, Osako, Japan
Filed July 22, 1968, Ser. No. 746,376
Int. Cl. B29d *21/00;* **B29c** *23/00*
U.S. Cl. 264—15 **3 Claims**



A method for forming spherically swollen headed filaments on a base fabric in a fabric fastener, comprising the steps of forming a number of projecting filaments of thermoplastic resinous material on one surface of a base fabric, soaking the base fabric in viscous liquid in a container, removing the base fabric from the liquid thereby forming a liquid layer among the projecting filaments, and then passing the base fabric along a heater, heating in such a manner that the one surface having the projecting filaments with liquid layer faces against the heater and is subjected to heat of the heater whereby exposed terminals of the filaments caused by evaporation of the liquid are melted and swelled by surface extension, thereby forming spherically swollen headed filaments on the base fabric.

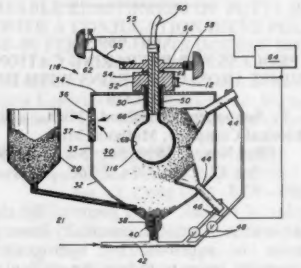
3,607,996
METHOD OF PROCESSING DENTURES
Alexander B. Pickands, 325 West Huron St., Chicago, Ill.
Filed Nov. 24, 1969, Ser. No. 879,532
Int. Cl. A61c *13/00*
U.S. Cl. 264—16 **4 Claims**

A method of processing dentures wherein the physical-chemical volumetric expansion and contraction of the polymerization investing compound is controlled by utilizing layered silicone to separate the denture resins from the mold surfaces and by removing the resin-filled plaster or stone casts as a unitary unit from the compression flask, placing said unit under yieldable pressure and subjecting such unit to a predetermined pressure and temperature for completing its curing cycle within a shortened period of time.

3,607,997
METHOD FOR PRODUCING AN X-RAY INTENSIFYING SCREEN
Patrick John Linturn, Ilford, Essex, England, assignor to Ilford Limited, Ilford, Essex, England
Filed July 25, 1968, Ser. No. 747,446
Claims priority, application Great Britain, July 31, 1967, 35030/67
Int. Cl. H01j *29/28*
U.S. Cl. 264—21 **3 Claims**

This application describes a method for the production of a self-supporting plastic-material film assembly which comprises coating onto a casting surface a thin layer of a solution of plastic material or a plurality of superimposed thin layers of solutions of plastic materials, each layer being dried before any subsequent layer is applied, the improvement which comprises coating on the dried top layer of plastic material a relatively thick layer of a plastisol, heating this layer to solidify the plastisol and removing the thus prepared film assembly from the casting surface, each layer of the assembly being selected so as to be strongly adherent in the product to the layer or layers with which it is in contact.

3,607,998
METHOD FOR PRODUCING HOLLOW ARTICLES
Walter R. Goodridge, Birch Groves, New Milford, Conn.
Filed Apr. 7, 1969, Ser. No. 814,121
Int. Cl. B29c *13/04;* **B29f** *5/02*
U.S. Cl. 264—24 **10 Claims**



A generally hollow article is produced by coating a flexible bladder with material, integrating the material into a uni-

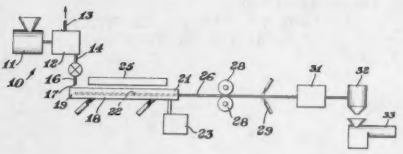
tary structure, and thereafter removing the bladder therefrom. The apparatus includes coating means to form a fluidized mass of integrable particles, a flexible bladder which provides the form for the article, and means to cause adherence of the material to the bladder.

3,607,999

FOAM SCRAP RECOVERY AND APPARATUS

John M. Corbett, and James L. Fookes, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 19, 1969, Ser. No. 834,677
Int. Cl. B02c 13/04; B29d 27/08; G08f 47/24; H05b 3/40
U.S. Cl. 264—25 5 Claims



Thermoplastic foam scrap is recovered as extrudable granules by grinding the scrap, passing it over a vibrating cooled trough, applying radiant heat to the scrap, cooling and grinding to provide an extrudable pellet or particle.

3,608,000

METHOD FOR SEALING LEAKS IN VESSELS

Amos R. Anderson, Adrian, Mich., assignor to Joseph J. Packo

Filed Aug. 20, 1969, Ser. No. 851,734
Int. Cl. B29c 23/00, 27/17
U.S. Cl. 264—36 13 Claims

The invention relates to a method for sealing leaks in pipes, conduits, gaslines, closed containers, tanks and the like. The interior of such equipment is first purged with a nonreactive dry gas, such as nitrogen, to remove any moisture and/or oxygen which may be present. Then the sealing composition is introduced into the interior of the equipment in a suitable inert gas vehicle under pressure. The sealant composition in the gas vehicle will escape from any leaks present in the equipment into the outer ambient atmosphere or adjacent soil in the case of pipelines buried in soil. The sealant reacts with oxygen and/or moisture to form at the situs of the leak a solid reaction product. The sealant composition comprises (1) a volatile metal alkyl compound and (2) a volatile organosilane compound. The volatile metal alkyl compound has the formula $M(R)_2$, wherein M is zinc or cadmium, or the formula $X(R)_3$, wherein X is aluminum, gallium, indium, or thallium, and R is an alkyl having 1 to 3 carbon atoms. The organosilane compound has the formula $R_{4-n}Si(OR')_n$, wherein R is an alkyl having 1 to 3 carbons atoms, R′ is an alkyl having 1 to 3 carbon atoms, and n is an integer from 1 to 4. The proportions of the metal alkyl compound may range by volume from about 1 percent to about 99 percent, the remainder being the organosilane compound.

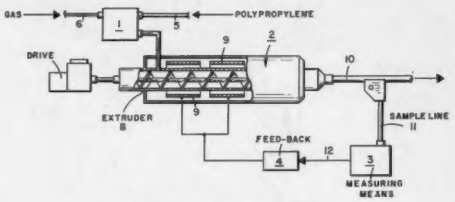
An illustrative sealant composition is a mixture by volume of 80 percent tetraethoxysilane and 20 percent diethyl zinc which is introduced in a stream of nitrogen into a pipeline under pressure to seal existing leaks. The sealant compositions are supplied to the interior of the apparatus or vessel which may contain leaks in sufficient concentration and suitable pressure so that upon escape from the leaks a solid seal will form in sites.

3,608,001

CONTROLLED DEGRADATION OF POLYPROPYLENE IN EXTRUDER-REACTOR

Ronald C. Kowalski, New Canaan, Conn.; John W. Harrison, Westfield, N.J.; John C. Staton, Baytown, and James P. Keller, Baytown, Tex., assignors to Esso Research and Engineering Company

Division of Ser. No. 602,676, Dec. 19, 1966, Patent No. 3,551,943. Filed Aug. 26, 1969, Ser. No. 853,017
Int. Cl. B29f 3/00
U.S. Cl. 264—40 5 Claims



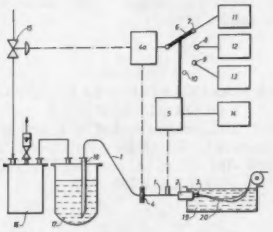
A process for producing in a reproducible, predictable and controllable manner a polypropylene having a desired weight average molecular weight and molecular weight distribution by heating the polypropylene in an extruder-reactor, sampling a portion of the polypropylene to measure a parameter of molecular weight and controlling the conditions in the extruder-reactor in response to the measured parameter.

3,608,002

PRODUCTION OF SPUN FILAMENTS OF UNIFORM THICKNESS

Dieter Wurstlin, Leverkusen, and Heinz Hornig, Cologne-Lindenthal, both of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of application Ser. No. 604,450, Dec. 23, 1966, now abandoned. This application Nov. 17, 1969, Ser. No. 871,676
Int. Cl. D01d 5/06, 11/00
U.S. Cl. 264—40 1 Claim

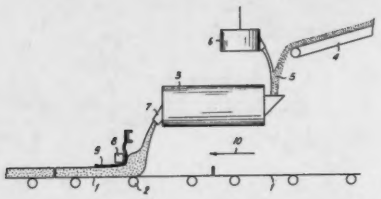


A process for the spinning of filaments of a substantially uniform thickness. Spinning fluid is forced under pressure from a storage means through conduit means into a spinneret and out spinning nozzles. The pressure of the spinning fluid is controlled according to the value measured by flow measuring means situated in the conduit. Significant pressure variation in the system is measured by measuring the pressure on the spinning fluid feed. The pressure variation measured is translated into switching means preset to operate in relation to the number of spinning nozzles operating. The appropriate preset flow rate controller is utilized depending upon the value measured by the pressure measuring means.

3,608,003
METHOD AND APPARATUS FOR PRODUCING LIGHTWEIGHT CONCRETE PLATES

Hermann Klaue, Montreux, and Emil Metzger, Thayngen, both of Switzerland, assignors to Insec Institution europienede Credit Trust, Valduz, Liechtenstein

Filed Nov. 21, 1966, Ser. No. 595,864
Claims priority, application Germany, Nov. 20, 1965, Jan. 15, 1966, Jan. 15, 1966, Feb. 5, 1966, K57705;K58152;K58153;K58345
Int. Cl. B28b *1/08*
U.S. Cl. 264—42 **8 Claims**

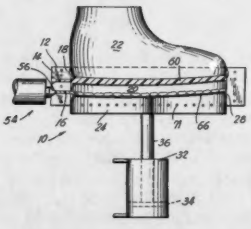


In a method and apparatus for producing lightweight constructional plates by casting a mixture of filling materials and a binder into a mold, a cement and water are continuously centrifuged to form a liquid cement binder, and the binder and filling materials are continuously fed to a slowly rotating drum mixer to form the mixture. The mixture is continuously supplied to a mold while the mold is moved at a speed coordinated with a rate of mixture supply thereto to fill the mold progressively to a uniform height, while progressively subjecting only the mixture in the mold to vibration and to leveling to a uniform height. The mixture is supplied to the mold at a rate so coordinated with the rate of mold movement that the hardening reaction of the liquid cement binder just begins when the mixture is subjected to such vibration. As each mold is filled and the mixture therein vibrated, the mold is transported to a curing area and, when the cast mixture has hardened and cured, it is removed from the mold and the mold is returned for refilling. A glass fiber mat, soaked in a liquid cement, is applied to at least the under surface of the cast mixture while the mixture is being cast and before the liquid cement coating of the glass fiber mat has completely solidified. The liquid cement applied to each glass fiber mat preferably has an addition of 20 to 30 percent of natural or synthetic rubber. Each plate may have imbedded therein one or more reinforcing grids, and these reinforcing grids, as well as the glass fiber mat or mats are supplied to the mixture in the mold in a continuous manner while each mold is being filled and its mixture vibrated.

3,608,004
METHOD OF MAKING FOOTWEAR HAVING A TWO-COLOR RUBBER SOLE

John F. Borisuck, and Reuben A. LaChall, both of Naugatuck, Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed May 16, 1968, Ser. No. 729,570
Int. Cl. B29h *7/08*
U.S. Cl. 264—244 **6 Claims**

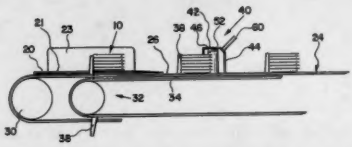


An article of footwear having a two-color rubber sole construction, and a method and apparatus for manufacturing the article. The sole construction includes a midsole-foxing component having foxing surrounding and engaging an outsole component which is vulcanized to the midsole-foxing component. The rubber used for the midsole-foxing component has a higher modulus than the rubber used for the outsole component. The higher modulus rubber is injected into a mold cavity having a column considerably greater than the volume of the injected rubber and a movable soleplate spreads the injection rubber against the underside of a lasted upper. The soleplate has a peripheral shoulder which determines the lower end and inner surface of the foxing. The lower modulus rubber is also injected into a mold cavity of considerably greater volume. The soleplate is again advanced toward the lasted upper to spread the outsole rubber against the midsole rubber to be vulcanized thereto.

3,608,005
METHOD FOR TREATING THE FLANGES OF CONTAINERS

Cecil P. Fortner, Bloomfield, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 10, 1968, Ser. No. 782,535
Int. Cl. B29c *25/00;* **B44d** *5/00*
U.S. Cl. 264—45 **9 Claims**

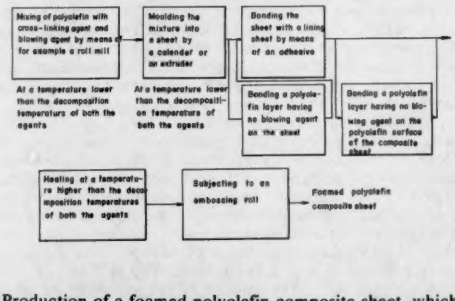


Containers of synthetic plastic material having an outwardly extending flange about at least a portion of their periphery have applied to the outer edge of the flange an organic compound which penetrates into the synthetic plastic material and which is caused to effect the synthetic plastic material so as to eliminate projecting portions for a smooth edge surface. Solvents and foaming agents may be used.

3,608,006
PRODUCTION OF FOAMED POLYOLEFIN COMPOSITE SHEET

Kirokuro Hosoda, Yokohama; Naonori Shiina, Tokyo; Hideyo Ueno, Tokyo; Junnosuke Sasajima, Yokohama; Junichi Yanase, Yokohama; Tetsuo Itoh, Funabashi, and Terutoshi Ohsumi, Matsudo, all of Japan, assignors to The Furukawa Electric Company Limited, Tokyo, Japan

Filed Sept. 25, 1967, Ser. No. 670,434
Claims priority, application Japan, Oct. 1, 1966, 41/64,703
Int. Cl. B29d *27/00*
U.S. Cl. 264—47 **17 Claims**


Mixing of polyolefin with cross-linking agent and blowing agent by means of for example a roll mill
At a temperature lower than the decomposition temperature of both the agents
Moulding the mixture into a sheet by a calender or an extruder
At a temperature lower than the decomposition temperature of both the agents
Bonding the sheet with a lining sheet by means of an adhesive
Bonding a polyolefin layer having no blowing agent on the sheet
Bonding a polyolefin layer having no blowing agent on the polyolefin surface of the composite sheet
Heating at a temperature higher than the decomposition temperatures of both the agents
Subjecting to an embossing roll
Foamed polyolefin composite sheet

Production of a foamed polyolefin composite sheet, which comprises milling the polyolefin with a cross-linking agent and a blowing agent homogeneously to obtain a composition, moulding the composition into a sheet, adhering the sheet

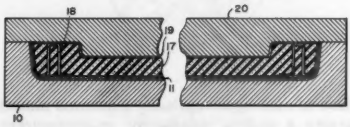
with a lining such as cloth or paper by means of an adhesive to form a composite sheet and then heating the composite sheet at a temperature higher than the decomposition temperatures of the cross-linking agent and the blowing agent to form cross-linkage and foam and subjecting to embossing.

3,608,007

METHOD OF FORMING A RIGID PANEL BY CASTING POLYURETHANE IN A RESIN IMPREGNATED PAPER SHELL

Bror W. Henrikson, Grand Rapids, Mich., assignor to American Seating Company, Grand Rapids, Mich.

Filed Aug. 5, 1968, Ser. No. 750,310
Int. Cl. B29d *27/04*
U.S. Cl. 264—45 **2 Claims**



A rigid panel, such as a desk top, is formed by molding and curing phenol-formaldehyde resin-impregnated paper sheets in the form of a hollow shell having depending sidewalls and open on its lower side, filling the interior of the shell with a polyurethane foam body, and curing the foam body to form a rigid porous interior structure, together with a skin reinforcing the shell and closing the open side of the shell. If desired, a sheet may be secured over the open lower side of the shell and the skin of the foam material united with the sheet.

3,608,008

METHOD OF FORMING A SKINNED POLYURETHANE FOAM BY OVERFILLING A CLOSED PREHEATED MOLD

Victor G. Soukup, and Donald Dunn, both of Cincinnati, Ohio, assignors to Cincinnati Milacron, Cincinnati, Ohio

Filed Sept. 13, 1968, Ser. No. 759,765
Int. Cl. B29d *27/04*
U.S. Cl. 264—45 **6 Claims**

A process for the production of rigid polyurethane articles with a hard dense skin which comprises charging a mold with liquid polyurethane foam components in a amount equal to twice but not exceeding ten times the quantity which would be required to give the same volume as the mold cavity were the foam allowed to free blow, said mold having been preheated to a temperature of from 110° to 175° F. before charging; closing the mold; curing said foam while externally heating to at least maintain the preheat of the mold; and removing the article from the mold.

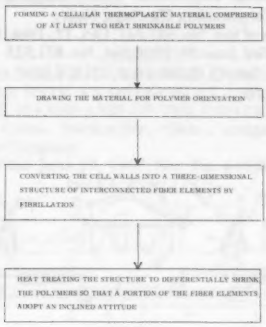
3,608,009

METHOD OF FRIBRILLATING A FOAMED EXTRUDATE COMPRISED OF TWO HEAT SHRINKABLE POLYMERS

Pushpkumar Dewanmal Changani, Newport, England, assignor to Monsanto Chemicals Limited, London, England

Filed Dec. 18, 1968, Ser. No. 784,722
Claims priority, application Great Britain, Dec. 21, 1967, 58,060/67
Int. Cl. B29d *27/00*; **D02g** *3/04*
U.S. Cl. 264—51 **1 Claim**

In a process for the production of a textured fiber assembly, which includes a three-dimensional structure of interconnected fiber elements; a foamed thermoplastic material comprising at least two different heat shrinkable polymers is drawn so that it becomes oriented essentially in one direction whereupon the walls of the drawn foamed material are converted into a three-dimensional structure of interconnecting fiber elements after which the structure is treated so


FORMING A CELLULAR THERMOPLASTIC MATERIAL COMPRISED OF AT LEAST TWO HEAT SHRINKABLE POLYMERS
DRAWING THE MATERIAL FOR POLYMER ORIENTATION
CONVERTING THE CELL WALLS INTO A THREE-DIMENSIONAL STRUCTURE OF INTERCONNECTED FIBER ELEMENTS BY FIBRILLATION
HEAT TREATING THE STRUCTURE TO DIFFERENTIALLY SHRINK THE POLYMERS SO THAT A PORTION OF THE FIBER ELEMENTS ADOPT AN INCLINED ATTITUDE

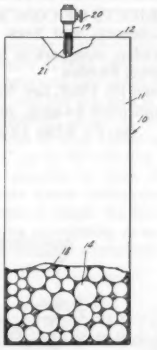
that a portion of the fiber elements adopt an inclined attitude.

3,608,010

METHOD OF FORMING A LIGHTWEIGHT STRUCTURAL ASSEMBLY BY JOINING ACRYLIC RESIN BALLS WITH A POLYESTER OR EPOXY RESIN MATRIX

Vance Allen Stayner, Wauconda, Ill., assignor to Federal-Huber Co., Chicago, Ill.

Filed Jan. 24, 1968, Ser. No. 700,212
Int. Cl. B29d *27/00*
U.S. Cl. 264—51 **5 Claims**

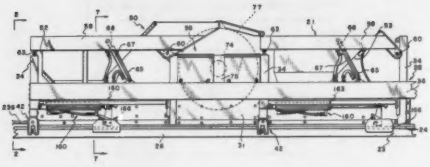


Method of forming a lightweight structural assembly of high structural strength comprising, in combination, a hollow member, a filler therein of hollow plastic balls and a resinous matrix therefor of a resin selected from the group consisting of epoxy and polyester resins. The method of making the assembly uses the hollow member as the mold and effects the formation and curing of the matrix resin by the exothermic reaction between the resin-forming components, thereby liberating sufficient heat to cause the plastic balls to expand and subsequently upon cooling to exhibit a stressed state than increases the structural strength of the resulting assembly. The hollow member is preferably formed of a lightweight rigid material, such as aluminum, an aluminum or magnesium alloy, or a resin, and the balls are preferably formed with thin continuous spherical walls of a polymethylmethacrylate or polymethacrylate with diameters varying from one-half to 1¾ inches. The balls are coated with a tacky polyester or epoxy resin prior to charging the balls into the cavity to cause the balls to become attached to one another and relatively fixed in place prior to introducing the liquid resin matrix.

3,608,011
METHOD OF FORMING CONTINUOUS PRE-STRESSED CONCRETE SLABS

Cordis W. Jones, Englewood, Colo., assignor to Hastings Dynamold Corporation, Hastings, Nebr.

Division of Ser. No. 587,041, Oct. 17, 1966, Patent No. 3,475,800. Filed June 30, 1969, Ser. No. 851,523
Int. Cl. B28b *1/08, 1/16, 23/04*
U.S. Cl. 264—70 2 Claims

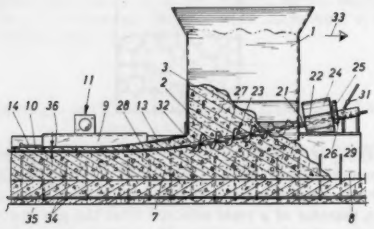


This disclosure relates to a method of producing hollow cored concrete slabs in a continuous operation from an initial concrete material having a slump test in the range of 0.5 to 4.0 per ASTM testing. More particularly, the method of the invention is a continuous one to produce the slabs wherein they are continuously formed, vibrated and trowelled, and wherein the concrete material is extruded to produce an elongated prestressed reinforced cored concrete slab.

3,608,012
METHOD FOR THE MANUFACTURE OF ELONGATED OBJECTS OF CONCRETE

Per Olof Jonell, Goteborg, and Sven Melker Nilsson, Kallered, both of Sweden, assignors to Ingeniorsfirman Nilcon Aktiebolag, Kallered, Sweden

Filed June 19, 1968, Ser. No. 738,276
Claims priority, application Sweden, June 29, 1967, 9602/67
Int. Cl. B28b *1/08*
U.S. Cl. 264—70 1 Claim

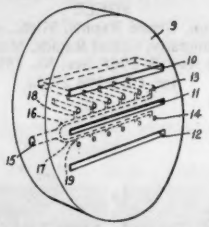


The present invention relates to a method for the manufacture of concrete objects by means of a slidable moulding assembly by feeding a concrete mass down from a movable container onto a support bed and vibrating the concrete for the compression of the concrete. The invention eliminates any risk of fissures in the final object primarily by inserting a reenforcement rod into the mass along with some water through an axial bore in a sleeve guide on the container, after a majority of the compressing or compacting of the mass has occurred. A container-carried rotating screw is used for separating, by means of its threads, the concrete remaining in the container from the concrete in the object being formed.

3,608,013
OPTICALLY PATTERNED MATERIAL

Raymond G. Ingham, Johnstown Near Wrexham, Wales, assignor to British Celanese Limited, London, England

Filed Oct. 8, 1968, Ser. No. 765,863
Claims priority, application Great Britain, Oct. 11, 1967, 46403/67
Int. Cl. B29c *9/00*; B29f *3/12*
U.S. Cl. 264—70 7 Claims

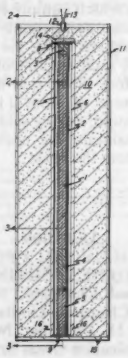


A method of making an optically patterned material comprising urging a molten translucent or transparent matrix polymer through a plurality of constrictions and intermittently injecting a visibly different molten polymer composition into at least some of the constrictions, thereby interrupting the flow of the matrix polymer composition therethrough, allowing the matrix polymer composition to purge the constrictions of the injected composition at the conclusion of each injection and combining and shaping the polymer composition streams emerging from the constrictions. Apparatus for making such optically patterned material is also described.

3,608,014
METHOD OF EXPLOSIVELY SHOCKING SOLID MATERIALS

Anthony S. Balchan, and George R. Cowan, both of Woodbury, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 4, 1969, Ser. No. 804,230
Claims priority, application Great Britain, June 28, 1968, 31,117/68
Int. Cl. B22f *3/08*
U.S. Cl. 264—84 8 Claims



An improved method of explosively shocking solid materials, e.g., powders, powder compacts, or nonporous solids, which are in the form of a solid circular cylinder, and preferably contained within a circular metal cylinder, comprising positioning the solid cylinder coaxially within a hollow circular metal cylinder with a spacing between the facing surfaces of the cylinders; explosively propelling the hollow

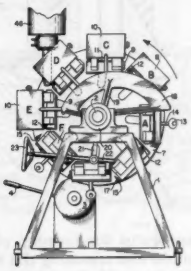
cylinder to cause progressive collision of the two cylinders; and separating the shocked solid, usually fragmentary or particulate, material from the metal cylinder(s) surrounding it after the collision.

3,608,015

PROCESS FOR THE PRODUCTION OF PLASTIC HOLLOW BODIES

Nerio Martelli, Bologna, Italy, assignor to Ethyl Development Corporation

Division of Ser. No. 510,788, Dec. 21, 1969, Patent No. 3,473,192. Filed Mar. 21, 1969, Ser. No. 840,862
Int. Cl. B29c *17/07, 23/00*
U.S. Cl. 264—89 2 Claims



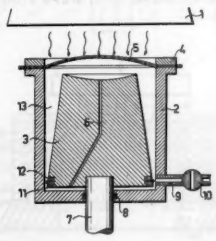
A process for the continuous production of hollow bodies from a softened tube of plastic material. A softened tube of plastic material is continuously extruded through the head of an extrusion machine and a part of successive sections of the tube is enclosed in a series of adjacent molds. The molds are moving at a spaced slightly greatly than the speed of extrusion and the remaining portion of each tube section is stretched while it lies between the extrusion head and one of the molds. The stretched portion of the tube is perforated for venting and the stretching causes elongation of the perforation which facilitates the venting. Suction is sequentially applied to each mold cavity to shape the enclosed tube portions against the molds and a cooling medium is circulated through the molds to cool the shaped tube sections.

3,608,016

METHOD OF FORMING AND PRODUCING PREFERABLY CUP-SHAPED HOLLOW BODIES BY DRAWING A MATERIAL CAPABLE OF BEING FORMED BY HEAT

Sven Nils Hakan Holmstrom, Loberod, and Jan-Erik Olsen, Lund, both of Sweden, assignors to AB Tetra Pak, Lund, Sweden

Filed Jan. 27, 1969, Ser. No. 794,257
Claims priority, application Sweden, Feb. 7, 1968, 1611/68
Int. Cl. B29c *17/04, 17/10*
U.S. Cl. 264—89 2 Claims



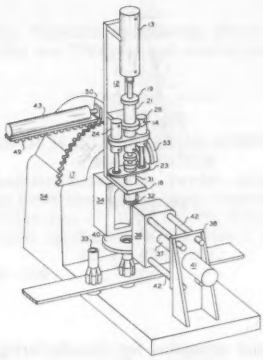
Cup-shaped hollow bodies formed by clamping a sheet of thermoplastic material over a closed space having a mandrel therein and heating the sheet and then moving the mandrel against the heated sheet to deform same and form the hollow bodies. Provisions are made for making the walls of the body substantially uniform and for severing the hollow body from the unused sheet of material.

3,608,017

METHOD FOR PRODUCING A BLOWN ORIENTED CONTAINER WITH AN OPENING AT AN ANGLE WITH THE MAJOR AXIS OF THE CONTAINER

Martin R. Cines, Bartlesville, Okla., assignor to Phillip Petroleum Company

Filed June 19, 1967, Ser. No. 646,882
Int. Cl. B29c *17/07*
U.S. Cl. 264—89 7 Claims



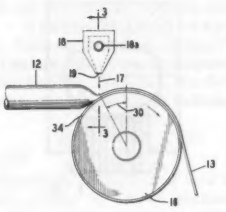
A parison, after proper temperature conditioning is stretched by being grasped at both ends and moving the ends of the parison apart relative to one another. The bottom end of the parison is closed and the top end is grasped in a molding device. A small amount of air is introduced into the parison to partially inflate it. One clamping unit is moved at an angle from about 15° up to 90° relative to the other in one plane. The stretched parison is then in proper position between the mold halves which subsequently close. Full air pressure is then admitted to finish the forming of a biaxially oriented container having an opening at an angle from 15° to 90° with the principal axis of the container.

3,608,018

COLLAPSING INFLATED TUBING

William E. Henderson, Hinsdale, Ill., assignor to Union Carbide Corporation

Filed Apr. 18, 1968, Ser. No. 722,383
Int. Cl. B29d *7/20*
U.S. Cl. 264—89 16 Claims



An apparatus and method are provided for collapsing an extruded inflated tubular material so that damage to the tu-

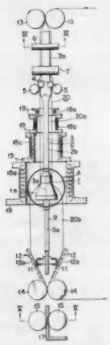
bular material upon collapse is minimized and substantially reduced.

3,608,019

METHOD AND APPARATUS FOR MANUFACTURING A BIAXIALLY ORIENTED CYLINDRICAL FILM BODY

Wasuke Sato, Kawasaki; Osamu Uemura, Yokohama, and Akihiro Hashimoto, Yokohama, all of Japan, assignors to Showa Denko K.K., Tokyo, Japan

Filed Mar. 6, 1970, Ser. No. 17,156
Claims priority, application Japan, Mar. 8, 1969, 44/17370
Int. Cl. B29c *17/07, 23/00;* **B29d** *23/04*
U.S. Cl. 264—95 **4 Claims**



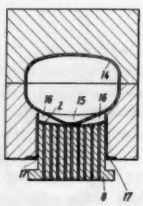
A method and apparatus for manufacturing a biaxially oriented cylindrical film body, which comprises providing a guide bar projecting above a mandrel to be inserted into a cylindrical film body, conducting said film body from the upper nip rollers positioned at the top of said guide bar down said guide bar to said mandrel and further to the lower nip rollers located below said mandrel with said guide bar and mandrel suspended by a plurality of pairs of rollers, whereby there is biaxially stretched said cylindrical film body by introducing compressed gas thereinto, while forming a thin layer of gas between the outer surface of said mandrel and the inner wall surface of said cylindrical film body.

3,608,020

METHOD FOR PREPARING LABELS OR PLATES IN A BLOW MOLDING PROCESS FROM THERMOPLASTIC ARTIFICIAL MATERIAL

Erhard Langecker, Hohbuschner Weg, Meinerzhagen, Germany

Filed Oct. 15, 1968, Ser. No. 767,719
Claims priority, application Germany, Aug. 22, 1968, P 17 86 133.5
Int. Cl. B29c *1/14, 5/06, 27/14*
U.S. Cl. 264—98 **3 Claims**



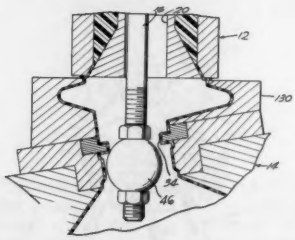
A process for applying label and plates on hollow bodies of thermoplastic synthetic substances in which a blow mold has openings therein to guide a punch and is provided with grooves for ventilation purposes. The method includes the insertion of a thin foil into a blow mold and holding the foil in a curved position, corresponding to the curve of the hollow body and finally holding a punch during the blowing process and in a receding position in relation to the walls of the mold.

3,608,021

METHOD AND APPARATUS FOR BLOW MOLDING AND TRIMMING PLASTIC ARTICLES

William E. Ziegler, Ann Arbor, Mich., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed July 24, 1969, Ser. No. 844,490
Int. Cl. B29c *17/07*
U.S. Cl. 264—98 **12 Claims**



Blow molding apparatus for forming plastic bottles and jugs in a sectional mold and trimming the neck of the bottle or jug before opening the mold. An extruder head is provided for extruding a molten plastic tube around a blow pin having an enlarged head at its end. The blow pin is axially reciprocable and in its advanced position is located so that the enlarged head is within the cavity of the sectional mold when the latter is closed about the extruded tubing. The sectional mold has a circular shear edge for cooperating with the enlarged head portion when the blow pin is retracted from the closed mold for severing from the blown bottle or jug the portion of the molten plastic material exterior of the cavity. The enlarged head of the blow pin is a ball which is supported on the stem of the blow pin and the stem has flexible properties and is mounted so that the ball will pilot itself through the circular shear edge even though misaligned with the shear edge, thereby permitting the mold to be tilted, if desired, relative to the extrusion orifice so that optimum placement of the plastic material within the mold can be realized.

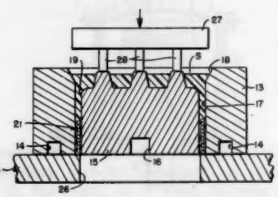
A method is disclosed comprising the steps of positioning a parison of molten plastic material about a ball, closing a sectional mold about the parison and ball, blowing the parison so that it conforms to the mold cavity, and removing the ball from the mold by a piloting action so that the ball in cooperation with the mold sections will trim the internal diameter of the opening in the blown article.

3,608,022

METHOD OF MOLDING ZERO DRAFT OBJECTS

Alan G. Wallskog, Prospect Heights, Ill., assignor to Teletype Corporation, Skokie, Ill.

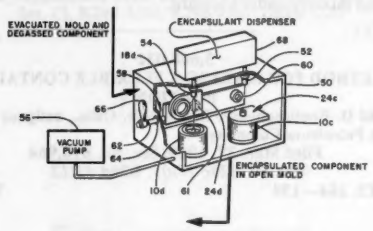
Filed Aug. 21, 1968, Ser. No. 754,426
Int. Cl. B29c *7/00;* **B29d** *3/00*
U.S. Cl. 264—102 **1 Claim**



A method of making voice coils having no mold release taper comprising pouring a casting resin into a mold includ-

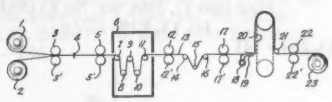
ing a nontapered outer member and a nontapered inner member, dropping a preformed coil of conductive material through the resin, curing the resin, forcing the inner member out the bottom of the coil and forcing the coil out the top of the outer member.

3,608,023
ENCAPSULATING METHOD
Donald D. Scarborough, Redington Shores, Fla., assignor to The United States of America as represented by the United States Atomic Energy Commission
Filed Sept. 4, 1969, Ser. No. 855,230
Int. Cl. B29c *6/02*
U.S. Cl. 264—102 1 Claim



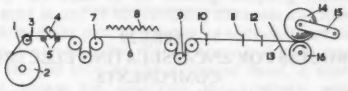
Method for encapsulating components utilizing individually evacuatable molds for receiving the components which may be separated and removed from the means evacuating the mold without loss of vacuum and positioned within an evacuated chamber where the molds may be opened and the component encapsulated under vacuum. The mold with encapsulated component may thereafter be subjected to atmospheric pressure and the encapsulant cured.

3,608,024
METHOD FOR PRODUCING CRIMPED CONJUGATED SPLIT FIBER
Masahide Yazawa; Yoshiaki Murono, and Kazuhiko Kurihara, all of Tokyo, Japan, assignors to Polymer Processing Research Institute Ltd., Itabashiku, Tokyo, Japan
Filed Feb. 7, 1968, Ser. No. 703,710
Claims priority, application Japan, Feb. 9, 1967, 42/8581
Int. Cl. B29d *7/24*
U.S. Cl. 264—103 6 Claims



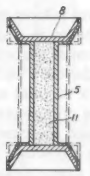
Method for producing crimped conjugated split fibers which comprises stretching simultaneously two kinds of films or tapes having mutual affinity but different heat-induced shrinkage which are stretchable with approximately the same stretch ratio in piled state whereby said two kinds of films or tapes are mutually adhered to form an integrally conjugated stretched film, splitting the resultant integrally conjugated stretched film into conjugated split fibers having potential shrinkage and developing crimps upon the goods made of said split fibers by heating under tensionless state.

3,608,025
SLITTING TO FORM FILAMENTS
Alexander Mirsky, 12, Montagu Mansions, York St., London, W.1., England
Filed Sept. 4, 1968, Ser. No. 757,446
Claims priority, application Great Britain, Sept. 5, 1967, 40538/67
Int. Cl. B29c *17/02, 17/14*
U.S. Cl. 264—103 10 Claims



Producing filaments by drawing plastic film laterally, slitting the film into filaments and drawing the filaments longitudinally.

3,608,026
METHOD OF MANUFACTURING RODS OR TUBES FROM POWDER
Sven-Erik Isaksson, Robertsfors, Sweden, assignor to Allmanna Svenska Elektriska, Aktiebolaget, Vasteras, Sweden
Filed Apr. 17, 1969, Ser. No. 816,977
Claims priority, application Sweden, May 2, 1968, 5908/68
Int. Cl. B29j *5/10*
U.S. Cl. 264—109 2 Claims



In hydrostatic compression of powder, the powder is enclosed in a capsule of yielding material having an opening therein. Adjacent the opening there is a portion of enlarged cross section connected to the adjacent portion of the main body of a capsule by a transverse member which is a plane substantially perpendicular to the axis of the opening. The opening is closed by a lid having a main body portion overlying the opening and sloping walls, the upper end of the lid being of substantially the same cross section as the enlarged part of the capsule. Upon subjecting the capsule filled with powder to hydrostatic compression, the powder and the main body are compressed while the wall of the enlarged section is pressed inwardly against the sloping wall of the lid.

3,608,027
METHOD OF MANUFACTURING DISPERSION STRENGTHENED LEAD
Alan Williams, Solihull, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed July 29, 1969, Ser. No. 845,916
Claims priority, application Great Britain, Aug. 9, 1968, 38063/68
Int. Cl. B22f *3/18*
U.S. Cl. 264—111 1 Claim

A sheet of dispersion strengthened lead is made by rolling powder between rollers in known manner. The invention resides in the choice of parameters to give optimum results. The powder size has a maximum value of 250 microns with a mean between 50 and 80 microns, and not more than 10 percent of the powder by volume has a particle size below 10 microns.

3,608,028

METHOD OF MAKING SINTERED AND COMPRISED THERMOPLASTIC PEARLS

Andre Paymal, Clermont, France, assignor to Compagnie de Saint-Gobain, Neuilly sur Seine, France

Filed Oct. 31, 1967, Ser. No. 679,412
Claims priority, application France, Nov. 3, 1966, 82,331
Int. Cl. B32b *5/28*; B29d *27/08*
U.S. Cl. 264—112 6 Claims

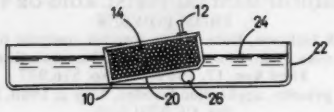
Strong structural materials of good insulating and fireproofing value are made from compressed polystyrene pearls and interstitial, hardened cementitious material.

3,608,029

PROCESS FOR ENCAPSULATING ELECTRONIC COMPONENTS

Arthur Joseph Hough, Shelton, Conn., assignor to Vitramon Incorporated, Monroe, Conn.

Filed Mar. 12, 1969, Ser. No. 806,744
Int. Cl. B29C *6/02*
U.S. Cl. 264—112 2 Claims



The present invention relates to a process for encapsulating electronic components in protective casings. More particularly, the component is placed in the case and the space between the walls of the case and the component filled with mineral beads having a thermal coefficient of expansion approximating that of the component. Holes are then drilled in two sides of the case and the case is placed in a container of liquid epoxy. Capillary attraction forces the epoxy in through one set of holes in the case, driving air out through the other set. After the case is filled with epoxy and devoid of air, it can be baked to harden the epoxy.

3,608,030

METHOD OF PREPARING A TABLET DOSAGE-FORM FOR THE IMMUNIZATION OF THE INTESTINAL TRACT WITH LIVE VIRUS PREPARATIONS

Howard Tint, 1731 Tyson Road, Havertown, Pa.

Continuation of application Ser. No. 567,247, Aug. 31, 1966, now Patent No. 3,458,621. This application May 21, 1969, Ser. No. 826,670
Int. Cl. A61k *9/00*, *27/00*
U.S. Cl. 264—113 1 Claim

A process for preparing an oral dosage-form suitable for the immunization of the intestinal tract with live virus preparations, which process comprises mixing live virus with a pharmaceutically acceptable excipient, compressing the resulting mixture into a coherent tablet, thereafter compressing a pharmaceutically acceptable excipient about the previously formed tablet in an encasing layer to form a coherent shell having a wall thickness of at least 0.03 inches, and finally completing covering the resulting composite tablet with an enteric coating. The oral dosage-form provided by the method assures the avoidance of undesirable release of live virus in the buccal cavity or the upper intestinal tract, which may result in direct infection in the upper respiratory areas.

ERRATUM

For Class 264—119 see:
Patent No. 3,607,500

3,608,031

PRODUCTION OF EXPANDED OLEFIN POLYMER MOLDINGS

Fritz Stastny, 3 Ottweilerstrasse, Ludwigshafen, (Rhine); Rudolf Gaeth, 10 Weinbietstrasse, Limburgerhof, Pfalz; Hans-Georg Trieschmann, 23 Birkenweg, Hambach, Weinstrasse, and Johann Zizlsperger, 22 Carl-Bosch-Ring, Frankenthal, Pfalz, all of Germany

Filed May 19, 1967, Ser. No. 639,656
Claims priority, application Germany, May 27, 1966, P 16 69 648.3
Int. Cl. B29g *7/02*; C08t *47/08*; C08g *22/44*
U.S. Cl. 264—126 4 Claims

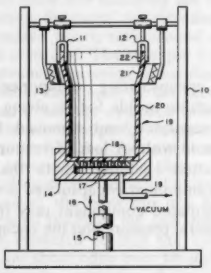
Production of moldings of expanded olefin polymers by mixing expanded particles of ethylene or propylene polymers with at least 0.3 gram/liter of said expanded particles of curable binders which contain less than 5 percent solvent based on the amount of binder, compressing the mixture by 5 percent to 70 percent of the bulk volume and curing the compressed mixture under pressure.

3,608,032

METHOD FOR MAKING A FLEXIBLE CONTAINER PORTION

Harold D. Boultinghouse, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Mar. 27, 1969, Ser. No. 810,964
Int. Cl. B29c *17/03*; B29d *23/13*
U.S. Cl. 264—138 7 Claims



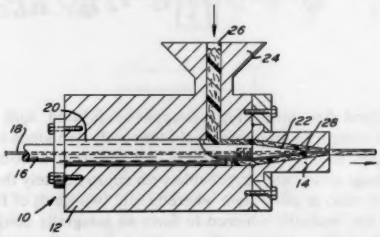
A method for forming an integral flexible closure for a container, said method comprising the steps of heating an upper cross-sectional portion of said container, stretching said heated portion to form a film, and permitting the stretched portion to cool.

3,608,033

PROCESS FOR PRODUCTION OF MOLDING COMPOSITIONS CONTAINING HIGH WEIGHT PERCENTAGE OF GLASS

Norman T. Hall, Phoenixville, Pa., assignor to Liquid Nitrogen Processing Corporation, Malvern, Pa.

Filed June 17, 1969, Ser. No. 833,983
Int. Cl. B29c *17/14*
U.S. Cl. 264—141 3 Claims



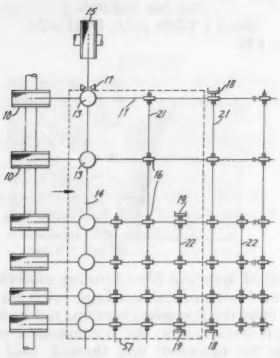
Process for production of molding compositions containing high weight percentage of glass comprising feeding an ex-

truded mixture of glass fibers and molten thermoplastic resin to a crosshead die, coating continuous glass roving with said mixture in said crosshead die, solidifying said molten thermoplastic while said thermoplastic is coated on said roving, and pelletizing the same into pellets containing between about 61 to 90 weight percent glass. The molding composition is in the form of such pellets which generally comprise right cylinders having a diameter of between three thirty-seconds and one-fourth inch and a height of between one-eighth to one-half inch.

3,608,034
PRODUCTION OF NETTING

Anthony Bramley, Gosford, Kidlington, Oxford, and John F. Gilbert, Chalford, both of England, assignor to said Bramley by said Gilbert

Division of Ser. No. 458,591, May 25, 1965, Patent No. 3,501,366. Filed Nov. 24, 1969, Ser. No. 879,424. Claims priority, application Great Britain, May 29, 1964, 22379/64
Int. Cl. B29d *3/00;* **B29h** *9/00;* **D01d** *5/20*
U.S. Cl. 264—145 **3 Claims**

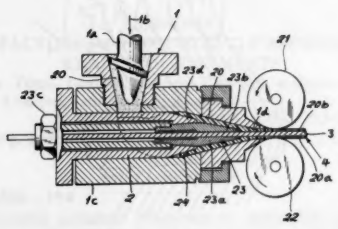


A method for producing netting is disclosed wherein a first plurality of flexible threads of plastic material are positioned in spaced parallel relationship. A second plurality of spaced, parallel and flexible threads extend transversely across the first threads. A plurality of small masses of plastic material are individually molded about the intersections of the two pluralities of threads and welded to the plastic material of each thread. Portions of some of the longitudinal threads are preferably electrically conductive and have exposed conductive surfaces to permit the netting to be used for electrified fencing.

3,608,035
METHOD OF MAKING SLIDE FASTENERS

Alfons Frohlich, Essen, Germany, assignor to Firma Opti-Holding AG., Glarus, Switzerland

Division of Ser. No. 620,972, Mar. 6, 1967, Patent No. 3,490,098. Filed Aug. 1, 1969, Ser. No. 846,882
Int. Cl. B28b *11/16;* **B29d** *5/00;* **B29f** *3/10*
U.S. Cl. 264—146 **10 Claims**



Method of making slide-fastener coupling elements wherein a flat (metallic or Teflon) die strip, having laterally open cutouts along its longitudinal edges with a spacing corresponding to the spacing of the heads of the coupling element and corresponding configuration, is passed through an extruder and continuously encased in a synthetic resin which, when hardened is cut away along at least one broad surface of the die strip to release the latter. The die strip has laterally extending projections; a cruciform section, and may be used in pairs to form rows of coupling members on opposite sides of a web onto which the coupling elements are molded. Formations prevent lateral transverse dislocation of the coupling elements when they are interconnected by a slider, e.g. a pair of strips flanking the female coupling members, a central rib flanked by the head of the mating coupling member, or ridges formed in one of the coupling elements and fitting into the complementary part of the mating slide-fastener element. Apparatus for making the slide fastener including means for returning the die strip to the extrusion head, a worm type plastifying means for supplying the synthetic resin and endless bands for masking the fabric as it is advanced through the extrusion die.

3,608,036
MAKING PLASTIC SPINNERETTES

James Bruce Peeso, Jr., Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

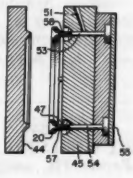
Filed June 16, 1969, Ser. No. 833,564
Int. Cl. B29c *17/02, 17/10*
U.S. Cl. 264—158 **3 Claims**

Spinnerettes are formed by casting and hardening plastic resin around an array of attenuable fibers, leaving one end of the fibers outside the casting. The fibers are thereafter extracted by applying a tensile force to their free ends to stretch the fibers and thus attenuate their cross-sectional dimensions. This causes the surfaces of the fibers to pull away from the cast resin and leave channels through the resin exactly conforming to the cross-sectional configuration of the fibers. Using this process spinnerettes can be formed as easily with precise noncircular holes as with circular holes.

3,608,037
METHOD FOR MAKING BEARING AND SEALING MEANS OR THE LIKE

Orville F. Genz, Elmwood Park, Ill., assignor to Hydro Component Research and Development Co., Chicago, Ill.

Division of Ser. No. 643,236, June 2, 1967, Pat. No. 3,519,280. Filed July 23, 1969, Ser. No. 844,006
Int. Cl. B29f *1/14;* **B29d** *3/02*
U.S. Cl. 264—161 **1 Claim**



A method is disclosed for making an annular sealing ring utilizing a two section mold mating along noncritical surface portions of the ring and having knockout pins projecting

through complementary channels to communicate with the mold cavity for ejecting the molded ring on disassembly of the mold. A thermoplastic material is injected into the mold through gate means leading to at least one of the channels. When the material has solidified, the mold is disassembled by actuating the knockout pins to eject the molded member and shear the thermoplastic material communicating with the channel through the gate means. The portion of the molded part formed by the extension of the material into the complementary channels is then broken away leaving the completed part.

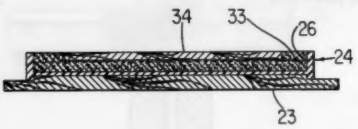
3,608,038
METHOD OF MAKING A PRECAST DECORATIVE PANEL

Frank R. Smith, 3461 Lansdowne Drive, Lexington, Ky.

Division of Ser. No. 842,806, July 7, 1967, which is a continuation of application Ser. No. 711,147, Feb. 16, 1968, now abandoned, which is a continuation-in-part of application Ser. No. 455,831, May 14, 1965, now abandoned. Feb. 19, 1970, Ser. No. 12,671

Int. Cl. B29d *3/02*

U.S. Cl. 264—162 **22 Claims**



A precast decorative panel is formed by filling a flexible mold to a selected level with an unset thermosetting resin and aggregates. After a nonrigid member, which is smaller than the receptacle, is placed on top of the mixture of resin and aggregates, a filler mold, which is smaller than the receptacle and substantially the same configuration so as to form a substantially uniform space therebetween, is disposed within the receptacle. This uniform space is filled with aggregates and an unset thermosetting resin. After the unset resin is partially cured to a soft gel, the filler mold is removed. Then, the partially cured resin is separated from the mold. This produces a panel having a textured top surface and a bottom surface with a drop edge extending therefrom along the entire periphery of the body of the panel.

3,608,039
PROCESS FOR THE HYDROGENATION OF AN OLEAGINOUS MATERIAL

Philip N. Ross, Jr., and James B. Edwards, both of Cincinnati, Ohio, assignors to The Proctor & Gamble Company, Cincinnati, Ohio

Filed Oct. 15, 1968, Ser. No. 767,855

Int. Cl. B01k *1/00*

U.S. Cl. 204—167 **8 Claims**

A process for the catalytic hydrogenation of an unsaturated oleaginous material using a suspended particulate catalyst and an alternating current electric field to promote the hydrogenation is disclosed. A product of the process is useful as a salad oil.

3,608,040
SPINNERET WITH STREAM GUIDE

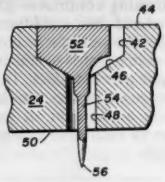
John M. Green, Gulf Breeze, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Feb. 10, 1969, Ser. No. 797,933

Int. Cl. B28h *21/54;* **B29f** *3/00;* **D01d** *3/00*

U.S. Cl. 264—176 **6 Claims**

A stream guide finger is mounted coaxially within a spinneret capillary and extends downwardly beyond the capillary



discharge opening, reducing the tendency of the molten stream to flick, bend or drip.

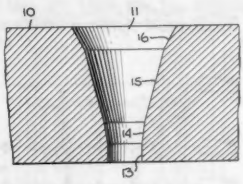
3,608,041
SPINNING PROCESS

Joseph Germano Santangelo, Morristown, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 750,839, Aug. 7, 1968, abandoned, which is a continuation-in-part of application Ser. No. 336,683, Jan. 3, 1968, now Patent No. 3,537,135. Filed Dec. 17, 1969, Ser. No. 885,996

Int. Cl. B28b *3/20;* **D01f** *3/26*

U.S. Cl. 264—176 **11 Claims**



A method of spinning fiber-forming material comprising forming three frustoconical portions, each having an apex angle larger than the foregoing section, and including a cylindrical portion downstream, the frustoconical portions being divergent to the upstream end thereof, said method permitting the production of lower denier material at a lower drawdown with superior mechanical properties and being characterized by ease of mechanical production to minimize jet deposits and prolong jet life.

3,608,042
PROCESS FOR PRODUCING A FILM OF SPLITFIBRE FORMING POLYMERIC MATERIAL

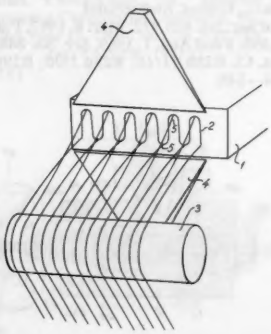
Ole-Bendt Rasmussen, Topstykket 7, 3460 Birkerod, Denmark

Filed May 29, 1968, Ser. No. 733,033

Claims priority, application Great Britain, May 30, 1967, 24837/68

Int. Cl. B29d *7/24;* **B29h** *7/18;* **D01d** *5/24*

U.S. Cl. 264—177 R **8 Claims**



Splitfibre forming polymeric material is extruded through a pleated slot and is then drawn down into flat form while in

substantially molten condition so as to produce transverse compression during longitudinal stretching.

3,608,043

METHOD OF REGENERATING SPINNING BATHS

Cesare Reni, and Luigi Lugo, both of Milan, Italy, assignors to Societa Italiana Resine S.p.A., Milan, Italy

Filed Dec. 16, 1968, Ser. No. 784,170
Claims priority, application Italy, Dec. 20, 1967, 24188-A/67
Int. Cl. B29h *19/00*
U.S. Cl. 264—179 11 Claims

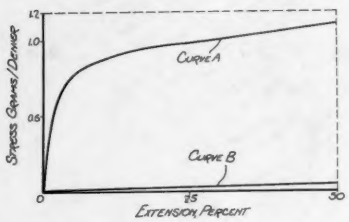
Cumene/dimethylformamide/paraffin spinning baths used in the preparation of acrylonitrile copolymer thread are regenerated by (i) admixture with the largely paraffin liquid from the drawing bath (ii) water separation of a fraction of the mixture to give an aqueous dimethylformamide layer and a cumene/paraffin layer and (iii) fractionation of the layers and recombination of the components with a nonseparated fraction of the mixture to give the desired spinning bath composition. The paraffins and dimethylformamide not required are recycled to the drawing bath and preparation of the acrylonitrile spinning solution, respectively.

3,608,044

PROCESS FOR MELT SPINNING POLYOXYMETHYLENE FILAMENTS HAVING ELASTIC RECOVERY

Myron J. Coplan, Dedham; Howard I. Freeman, Sharon, and Joseph S. Panto, Dedham, all of Mass., assignors to Celanese Corporatisn, New York, N.Y.

Continuation-in-part of application Ser. No. 341,725, Jan. 31, 1964, now abandoned. This application Jan. 28, 1969, Ser. No. 816,136
Int. Cl. D01d *5/12*; D01f *3/10*
U.S. Cl. 264—210 4 Claims



A process for producing filamentary material of an oxymethylene polymer having an elastic recovery at 70° F. of at least about 70 percent when subjected to a strain of up to 50 percent.

3,608,045

MANUFACTURE OF MORE DYEABLE REGENERATED CELLULOSE FILAMENTS

Bryan A. Toms, Leamington Spa, England, assignor to Courtaulds Limited, London, England

Filed Dec. 11, 1968, Ser. No. 783,098
Claims priority, application Great Britain, Dec. 13, 1967, 56592/67
Int. Cl. D01f *3/12*
U.S. Cl. 264—194 7 Claims

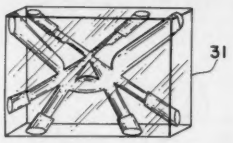
Regenerated cellulose filaments of enhanced dyeability made by extruding and regenerating a viscose mixed with an aqueous solution of an aminoethyl cellulose containing at least 2 percent nitrogen.

3,608,046

TECHNIQUE OF DUPLICATING FRAGILE CORE

Albert R. Philips, and Richard F. Heilbaum, both of Hampton, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Sept. 30, 1968, Ser. No. 763,684
Int. Cl. B29c *1/02, 1/06, 1/08*
U.S. Cl. 264—221 3 Claims



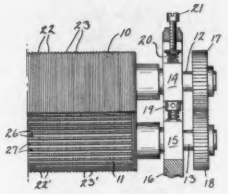
A method of fabricating individual and complete fluid circuit components by the construction of temporary one-shot disposable dies which are used to produce the fragile core or pattern.

3,608,047

METHOD OF MANUFACTURING EMBOSSED PAPER PRODUCTS

Robert B. Wiggins, Green Bay, Wis., assignor to Fort Howard Paper Company

Division of Ser. No. 622,993, Mar. 3, 1967, Pat. No. 3,418,925.
Filed Mar. 8, 1968, Ser. No. 711,676
Int. Cl. B29d *7/14*
U.S. Cl. 264—286 2 Claims



A method for continuously embossing a pattern in a paper web. A pair of parallel rollers having a nip therebetween provided. The rollers are biased together while the web is between the rollers. Circumferentially alternating strips having an embossing pattern and axial relief grooves at least coextensive in length with the width of the paper web are provided in the outer periphery of one of the rollers. An interengaging embossing pattern is provided in the other roller. The biasing pressure is intermittently relieved between the rotating rollers when the axial grooves are rotated to a position at the nip between the rollers thereby causing the rollers to jump together by the biasing pressure. The impact of the movement is absorbed by the paper web to set the pattern in the paper web.

3,608,048

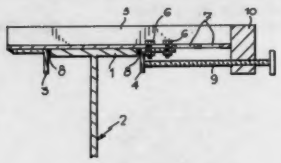
METHOD FOR MANUFACTURING A PREBENT GIRDER EMBEDDED IN CONCRETE

Abraham Lipski, Uccle, Belgium, assignor to Procedes Nouveaux De Construction, "Preflex" Societe Anonyme, Saint-Gilles, Belgium

Filed Aug. 11, 1969, Ser. No. 848,791
Claims priority, application Belgium, Aug. 19, 1968, 62,396
Int. Cl. B28b *23/06*
U.S. Cl. 264—228 3 Claims

Method for manufacturing a prebent girder embedded in concrete wherein the rigid metal joist of said girder is prebent, the joist is maintained prebent and the tension flange of said joist is embedded in a mass of concrete. Before the prebending, a rigid metal structure, constituted essentially, on

the one hand, by longitudinal elements arranged against the edges of said compressed flange and, on the other hand, by

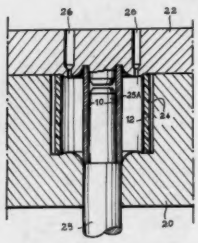


transverse connection elements, is temporarily applied to the compressed flange of the joist, said structure acting to avoid lateral buckling of the compressed flange.

3,608,049
PROCESS FOR MANUFACTURING A RESILIENT MOUNTING ELEMENT

Corrado Tavella, Milan, Italy, assignor to Societa Applicazioni Gomma Antivibranti "Saga" S.p.A., Milan, Italy

Filed July 24, 1968, Ser. No. 747,325
Claims priority, application Italy, Sept. 29, 1967, 21,055-A/67
Int. Cl. B23p *11/02, 19/02;* **B29c** *25/00;* **B29h** *9/11;* **F16f** *1/38*
U.S. Cl. 264—229 **2 Claims**



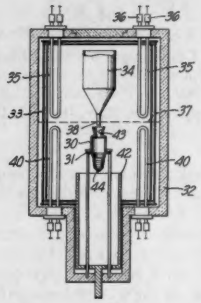
A method for manufacturing a resilient mounting element having a vulcanized rubber sleeve interposed between two cylindrical bushings. Inner and outer cylindrical bushings are coaxially positioned within a cylindrical mold cavity. The outer bushing is made of a resilient plastic having a relatively high tensile strength and modulus of elasticity and has a diameter somewhat smaller than the diameter of the mold cavity. Rubber is injected under pressure between the bushings to cause a controlled resilient increase in the diameter of the outer bushing to force the outer bushing against the mold cavity wall. The injection pressure is maintained while the rubber is vulcanized and the pressure is then released. The outer bushing then resiliently returns toward its original diameter, thereby compensating in part for the shrinking strains in the rubber.

3,608,050
PRODUCTION OF SINGLE CRYSTAL SAPPHIRE BY CAREFULLY CONTROLLED COOLING FROM A MELT OF ALUMINA

Justice N. Carman, Tarzana, and Herman G. McKnight, Northridge, both of Calif., assignors to Union Carbide Corporation

Filed Sept. 12, 1969, Ser. No. 864,270
Int. Cl. C04b *35/10, 35/60*
U.S. Cl. 264—332 **20 Claims**

A charge of alumina is placed in a mold and heated in a vacuum or an inert gas atmosphere to melt the charge. The melt is then cooled in a generally upward direction to solidify and crystallize the melt at a rate that the generally vertical, downward temperature gradient in the crystallizing zone is less than 25° C. per millimeter. After all of the melt has

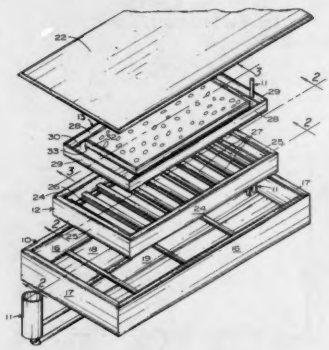


crystallized the single crystal is uniformly cooled and removed from the mold. Special methods of making the mold and removing the mold are also disclosed.

3,608,051
WAX MOLD CASTING OF CONCRETE

Ralph K. Scott, Kennewick, Wash., assignor to Columbia Fabricators, Inc., Kennewick, Wash.

Filed Mar. 7, 1969, Ser. No. 805,178
Int. Cl. B28b *23/00*
U.S. Cl. 264—261 **6 Claims**



A process to cast at least part of the peripheral surface of a concrete structural element against a wax mold which may also serve as a matrix to position form or surface elements to be embedded in the concrete. The initial mold is established from liquid wax, the wax allowed to set, and the mold removed from the cast formed after setting of the concrete by hot water or steam which also serves to cure the concrete. The process allows simple mold formation for and removal from complex concrete structural forms, especially those having embedded surface elements and undercut surfaces. Apparatus is disclosed to conveniently carry out the process.

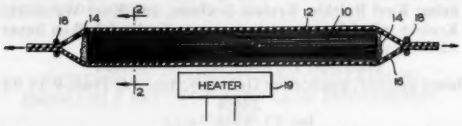
3,608,052
METHOD FOR FABRICATING FIBER REINFORCED ARTICLES

Kenneth M. Gunn, Chesterfield, Va., assignor to Texaco, Inc., New York, N.Y.

Continuation of application Ser. No. 660,781, Aug. 15, 1969, now abandoned. This application Feb. 12, 1970, Ser. No. 10,064
Int. Cl. B29c *15/00;* **B29d** *3/02;* **B29g** *7/00*
U.S. Cl. 264—295 **8 Claims**

A method for fabricating fiber reinforced articles. A plurality of elongated fibers are formed into a bundle and im-

pregnated with a resin matrix material. The impregnated bundle is encapsulated in a resilient tube and longitudinal



tension is applied to the tube to align and consolidate the fibers in the bundle while the resin cures, after which the tube is removed from the bundle.

3,608,053

CURED LATEX ARTICLE AND METHOD OF MAKING SAME

Armand J. Agostinelli, East Haven, Conn., assignor to Dart Industries, Inc., Los Angeles, Calif.

Continuation-in-part of application Ser. No. 720,853, Apr. 12, 1968, now abandoned. This application Oct. 30, 1969, Ser. No. 872,659

Int. Cl. B29h *3/04*

U.S. Cl. 264—306 **7 Claims**

A method for making rubber latex articles such as surgeon's gloves which are hyperallergenic and which permit improved epidermal perception through the article. The method comprises curing the inside and outside surfaces of a coagulated latex film by contacting the surfaces with sulfur monochloride until the film is cured sufficiently so the film will recover its original shape when the film is stretched and released.

3,608,054

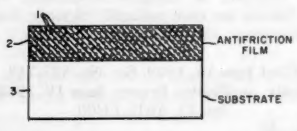
CAST LUBRICATING FILMS AND COMPOSITES THEREOF

William M. Alvino, Penn Hills, Pittsburgh, and James H. Freeman, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 29, 1968, Ser. No. 724,728

Int. Cl. B44d *1/36, 5/08*

U.S. Cl. 264—309 **6 Claims**



An antifriction high temperature composite is formed of a metal or other support or substrate and a cast thin lubricating film. The thin film has a plastic matrix containing a multiplicity of dispersed small discrete solid lubricant filler particles. The plastic is either an aromatic polyamide-imide or an aromatic polyimide and the filler is a finely divided solid lubricant such as MoS_2.

3,608,055

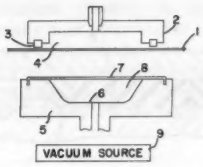
METHOD OF SHAPING PLASTIC SHEET MATERIAL

Florren E. Long, LaGrange, Ill., assignor to Continental Can Company Inc., New York, N.Y.

Filed Dec. 9, 1968, Ser. No. 782,046

Int. Cl. B29c *1/04, 7/00, 17/04*

U.S. Cl. 264—316 **5 Claims**



A method of drawing a formable material by vacuum drawing in which a flexible diaphragm is placed below and next to the formable sheet material. A vacuum is applied to the underside of the flexible diaphragm to draw it and the formable sheet into a female die. The formed sheet is then withdrawn from contact with the diaphragm.

3,608,056

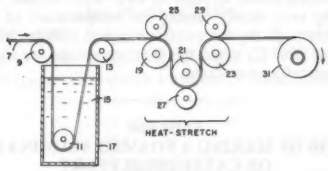
STEAM RETICULATION OF FOAMED PLASTIC SHEETING

Dorsey C. Nelson, Springfield, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed Jan. 29, 1969, Ser. No. 795,125

Int. Cl. B29d *7/22, 7/24, 27/00*

U.S. Cl. 264—321 **10 Claims**



Reticulation of foamed or cellular materials by applying water onto such material, converting the water to steam and confining the steam to passage through the material whereby membranous portions of the material are ruptured under the pressure created as the water expands during its conversion into steam.

3,608,057

PROCESS FOR MAKING CONTACT LENSES

Harris J. Bixler, Lexington, and Mary Ann Kendrick, Cambridge, both of Mass., assignors to Amicon Corporation, Lexington, Mass.

Filed Oct. 3, 1967, Ser. No. 672,467

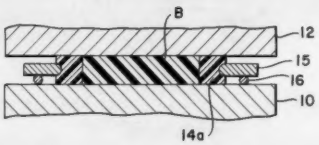
Int. Cl. B29b *3/00;* **B29c** *25/00;* **C08f** *45/34, 45/36, 45/44, 45/46*

U.S. Cl. 264—322 **4 Claims**

A process for making an article, and the articles formed thereby from an ionically cross-linked polymer; said process comprising the essential steps of forming a composition comprising a said polymer and a nonvolatile organic plasticizer therefor, forming said article by molding and/or machining steps, leaching said plasticizer from the formed article, and replacing it with water or an aqueous solution. The process is particularly useful in the manufacture of a novel contact lens

because it results in articles of unexpectedly good color characteristics and a high water content which had never before been achieved.

3,608,058
METHOD FOR MANUFACTURE OF VOID-FREE AND WARP-FREE SLAB STOCK
Paul M. Coffman, Cherry Hill, N.J., assignor to Shell Oil Company, New York, N.Y.
Continuation-in-part of application Ser. No. 633,673, Apr. 19, 1967, now abandoned , which is a continuation-in-part of application Ser. No. 524,743, Feb. 3, 1966, now abandoned. This application Sept. 11, 1969, Ser. No. 857,176
Int. Cl. B29c *1/02*
U.S. Cl. 264—313 4 Claims



Void-free slabs or billets of thermoplastic polymer are produced by cooling polymer melt in a mold under pressure while keeping part of the melt in contact with a heat-insulating deformable surface of the mold cavity.

3,608,059
HEAT-RELAXING CELLULOSE TRIACETATE FILM SLOWLY THROUGH THE RANGE 180° C.–220° C.
Billy R. Dotson; Marilyn A. Twomey, and Robert F. Williams, Jr., all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 2, 1970, Ser. No. 440
Int. Cl. B29c *25/00*
U.S. Cl. 264—345 3 Claims

It has been found that highly crystallized cellulose triacetate films or sheets having improved dimensional stability at temperatures as high as 240°–250° C. can be manufactured by very slowly raising the temperature of the films or sheets through the temperature region of from about 180° C. to about 220° C. while the films or sheets are maintained under practically no restraint.

3,608,060
METHOD OF MAKING A FOAMED ALUMINA SHAPE OR CATALYST SUPPORT
Harry E. Osment, and Raymond L. Williams, both of Baton Rouge, La., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.
Filed Sept. 20, 1968, Ser. No. 761,283
Int. Cl. C04b *21/02*; B01j *11/60*
U.S. Cl. 264—42 10 Claims

A hydrated alumina which has been calcined to reduce its loss on ignition to below 12 percent and which is capable of at least partial rehydration is mixed with water and a blowing agent to form a slurry. The slurry is heated to below 100° C. to activate the blowing agent causing bubbles to form in the slurry. The slurry is then poured into a mold and heated to cause the alumina to rehydrate stabilizing the foamed body which is then activated at 350°–700° C.

3,608,061
RADIOPAQUE ESOPHAGEAL MARSHMALLOW BOLUS
Edmund F. McNally, 46-44 Hanford St., Douglaston, N.Y.
Filed Aug. 21, 1968, Ser. No. 754,462
Int. Cl. A61k *27/08*
U.S. Cl. 424—4 3 Claims

A radiopaque esophageal bolus which comprises a marshmallow containing a radiopaque material in an amount sufficient to render the bolus opaque when exposed to X-rays or roentgen rays.

3,608,062
SHAPED ARTICLES WITH LONG-TERM VAPOUR EMISSION
Franz Alfes, Krefeld; Wolfgang Behrenz, Cologne-Stammheim; Karl Raichle, Krefeld-Bochum, and Kurt Weirauch, Krefeld, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany
Filed Dec. 17, 1968, Ser. No. 784,488
Claims priority, application Germany, Jan. 16, 1968, P 16 94 240.8
Int. Cl. A61k *24/12*
U.S. Cl. 424—22 9 Claims

Shaped articles having long term vapor emission comprising a thermosetting resin produced from an unsaturated polyester and a vinyl monomer copolymerizable therewith, containing an effective amount of 0,0-dimethyl-0-(2,2-dichlorovinyl)-phosphoric acid ester as pesticidally, e.g. insecticidally and/or acaricidally, active compound, in a ratio by weight of active compound to resin of e.g. about 0.25–2 : 1, and also containing a solid filler, and optionally a liquid filler.

3,608,063
MOLECULAR DRUG ENTRAPMENT PROCESS AND COMPOSITIONS
Gilbert S. Banker, School of Pharmacy, Purdue University, Lafayette, Ind.
Continuation-in-part of application Ser. No. 757,142, Sept. 3, 1968. This application Aug. 15, 1969, Ser. No. 850,664
Int. Cl. A61k *27/12*
U.S. Cl. 424—22 10 Claims

Pharmaceutical compositions are prepared by combining in the presence of water and a carboxylic acid a polymer having acidic or basic functionality with a pharmaceutically active material having respectively basic or acidic functionality, coagulating or otherwise separating the product produced and then formulating the product by conventional techniques into suitable dosage forms. The resulting products are characterized by possessing unique sustained-release, enteric or delayed-release properties.

3,608,064
MILK-BUFFERED ASPIRIN
Anthony H. Lamb, 66 King St., Hillside, N.J.
Filed Oct. 7, 1969, Ser. No. 864,486
Int. Cl. A61j *3/07*, *3/10*
U.S. Cl. 424—36 7 Claims

A mixture of aspirin and powdered milk.

3,608,065
AEROSOL COMPOSITION CONTAINING A VASOCONSTRICTOR
Myron J. Lover, Mountainside, and Maria C. Rodon, Elizabeth, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Filed Sept. 11, 1969, Ser. No. 857,229
Int. Cl. A61k *27/00*
U.S. Cl. 424—45 2 Claims

An aerosol composition containing phenylephrine as the vasoconstrictor is made exceptionally uniform by using dipropylene glycol as a cosolvent.

3,608,066
PHARMACEUTICAL PREPARATION BASED ON BACTERIAL ANTIGENS
Paul-Robert Illartein, la Chapelle-St-Mesmin, France, assignor to Societe en nom collectif "Science Union et Cie Societe Francaise de Recherche Medicale," Surresues, France
Filed June 16, 1969, Ser. No. 833,719
Claims priority, application France, June 19, 1968, 155,603
Int. Cl. A61k *13/00*
U.S. Cl. 424—46 10 Claims

A pharmaceutical preparation for the treatment of infections of the respiratory tract, consisting of, in the desiccated and finely micronized state, lyophilized killed micro-organ-

isms and their lyzates, selected from specific micro-organisms previously recognized to be responsible for such kind of infection, and also micro-organisms not previously recognized to be responsible for such kind of infection, and administered by inhalation in aerosol form.

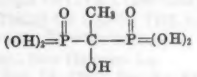
3,608,067

DENTIFRICE COMPOSITIONS CONTAINING INSOLUBLE SALTS OF ALKYLENE PHOSPHONIC ACIDS

Riyad R. Irani, Mentor, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Filed Feb. 6, 1969, Ser. No. 797,242
Claims priority, application Trinidad And Tobago, Mar. 8, 1968, 25/68
Int. Cl. A61k *7/16*
U.S. Cl. 424—49 **3 Claims**

Dentifrice composition containing as the primary polishing agent a substantially water-insoluble salt of an alkylene phosphonic acid such as the calcium salt of an alkylene diphosphonic acid having the formula, e.g.



3,608,068

FLAVOR COMPOSITION

George H. Fuller, Colonia, and Stephen Klisch, Somerset, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 20, 1969, Ser. No. 809,035
Int. Cl. A61k *7/16*
U.S. Cl. 424—49 **5 Claims**

A flavor composition which simulates the flavor of chloroform. The composition contains methylene chloride a nontoxic perfluoro saturated hydrocarbon. The flavor composition is particularly suitable for use in an oral preparation.

3,608,069

SIALAGOGUE

George Herbert Fuller, Colonia, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 20, 1969, Ser. No. 809,019
Int. Cl. A61k *7/16*
U.S. Cl. 424—52 **17 Claims**

A sialagogue composition particularly suitable for use in an oral preparation. The sialagogue contains perillartine as a sweetener and methylene chloride as a flavoring agent. The methylene chloride may be used in mixture with a nontoxic perfluoro saturated hydrocarbon.

3,608,070

NEW SURGICAL DRESSING

Lucien Nouvel, 91 Ave. der Ternes, Paris, XVII° , France

Filed Oct. 13, 1969, Ser. No. 866,028
Int. Cl. A61b *17/04;* **A61k** *15/00;* **A611** *15/00*
U.S. Cl. 424—80 **5 Claims**

The dressing excipient is composed essentially of vinyl pyrrolidone-vinylacetate copolymer which is soluble in a lower aqueous alcohol and which is capable of giving a film on the skin; a thixotropic agent of a triglyceride of hydroxylated fatty acids having 12–24 carbon atoms, preferably 12-hydroxystearic acid glyceride; a solvent for the resin, which fairly rapidly dries on the skin, namely aqueous alcohol; and a plasticizer of polyoxyethylene-glycol and/or acetoglycerides.

3,608,071

MANUFACTURING ADSORBED VACCINES

Edgar Relyveld, Paris; Marcel Raynaud, Versaille; Andre Turpin, Paris, and Monique Digeon, Paris, all of France, assignors to Institut Pasteur, Paris, France

Filed Sept. 20, 1968, Ser. No. 761,278
Claims priority, application France, Sept. 26, 1967, 122284
Int. Cl. A61k *27/00*
U.S. Cl. 424—88 **7 Claims**

A method has been found, which makes it possible to prepare a composition containing one or more vaccines adsorbed on an appropriate substrate. The method comprises introducing one or several antigens into an aqueous solution of dibasic sodium phosphate having preferably a concentration of 0.01 M to 0.5 M, adding to the mixture thus formed an amount of calcium chloride in aqueous solution, preferably substantially equivalent to that of the phosphate, and adjusting the pH of the mixture to a value close to 7, preferably about 6.8 to 7. A precipitate forms, which adsorbs the antigens, and it is recovered. The best concentration of the calcium chloride solution is in the range of 0.01 M to 0.5 M.

3,608,072

FISH TOXICANT COMPOSITIONS AND METHOD OF USING THEM

Bernard L. Berger, La Crosse, Wis.

Filed Mar. 21, 1969, Ser. No. 809,372
Int. Cl. A01n *9/02, 9/36, 23/00*
U.S. Cl. 424—121 **2 Claims**

Undesirable fish are killed by exposing them to an aqueous solution or dispersion of a toxicant composition comprising a combination of antimycin A and naled.

3,608,073

EMULSION OF PILOCARPINE FOR OPHTHALMIC USE

Russell E. Phares, Jr., and Hans H. Kaspar, both of Sunnyvale, Calif., assignors to Barnes-Hind Pharmaceuticals, Inc.

Filed July 16, 1968, Ser. No. 745,175
Int. Cl. A61k *27/00*
U.S. Cl. 424—168 **5 Claims**

An easy to apply, stable and effective form of pilocarpine is provided by an oil-in-water emulsion of pilocarpine.

3,608,074

PHARMACEUTICAL COMPOSITIONS AND METHOD OF MAKING THE SAME

Yves Rocher, 41 Ave. Foch, Paris, France,

Division of Ser. No. 431,710, Feb. 10, 1965, Pat. No. 3,464,972.
Filed Feb. 29, 1968, Ser. No. 709,494
Int. Cl. A61k *27/00*
U.S. Cl. 424—195 **2 Claims**

Humans afflicted with hemorrhoids or rosacea are treated by topical application of an ointment comprising as the active ingredients, pure saponins obtained from the root of *Ficaria ranunculus.*

3,608,075

COMPOSITIONS AND METHODS OF TREATING THE MENOPAUSAL SYNDROME

William L. Glen, Baie D'Urfe, Quebec, Canada, and Max Gahwyler, Darien, Conn., assignors to American Home Products Corporation, New York, N.Y.

Filed July 28, 1969, Ser. No. 845,488
Int. Cl. A61k *17/06*
U.S. Cl. 424—238 **10 Claims**

A method and composition for treatment of the menopausal syndrome in women utilizing, as the treatment

agent, a composition containing sodium 17β-dihydroequilin sulfate as the sole estrogenic agent. Sodium 17β-dihydroequilin sulfate may be administered orally or parenterally in the usual dosage forms and adverse side effects are virtually absent at effective dose levels.

3,608,076

USE OF STEROID DERIVATIVES AS ANTIFERTILITY AGENTS

Milton David Heller, New City; John Anthony Coppola, Suffern, and Seymour Bernstein, New City, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 13, 1969, Ser. No. 865,961
Int. Cl. A61k *27/00*
U.S. Cl. 424—241 **4 Claims**

Derivatives of certain 16α, 17α-dihydroxysteroids of the pregnane series are described. These steroids are useful for controlling fertility in warmblooded female animals.

3,608,077

STABILIZATION OF METAL STEROID ALCOHOL SULFATES

Robert Ginsig, Mexico City, Mexico, assignor to Syntex Corporation Panama Republic of Panama

Filed Nov. 13, 1969, Ser. No. 876,592
Int. Cl. A61k *27/00*
U.S. Cl. 424—243 **13 Claims**

A stabilized synthetic alkali metal estrogen sulfate mixture containing one or more synthetic alkali metal estrogen sulfates and urea. The mixture increases the stability of the estrogen sulfate component thereby increasing shelf life and pharmaceutical usefulness.

3,608,078

1-SULFAMOYLHEXAMETHYLENIMINE AS AN ANALEPTIC AGENT

John H. Gogerty, Dover; William J. Houlihan, Mountain Lakes, both of N.J., assignors to Sandoz-Wander, Inc., Hanover, N.J.

Filed Nov. 21, 1969, Ser. No. 878,907
Int. Cl. A61u *27/00*
U.S. Cl. 424—244 **4 Claims**

1-Sulfamoylhexamethylenimine is useful as an analeptic agent at dosages of from about 3.5 to 350 mg. i.v. in large animals.

3,608,079

THIOURACIL-CARBOXYLIC ACIDS FOR TREATMENT OF VIRUSES

Hermann Moor, Binningen, Switzerland, assignor to Chemofarma A. G., Basel-Landschaft, Switzerland

Filed Apr. 18, 1968, Ser. No. 722,183
Claims priority, application Great Britain, Apr. 19, 1967, 18,102/67
Int. Cl. A61k *27/00*
U.S. Cl. 424—251 **5 Claims**

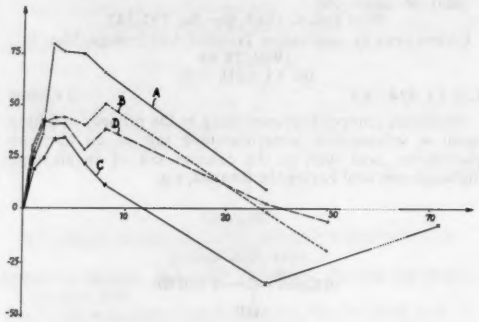
Pharmaceutical compositions comprising 2-thiouracil-4-carboxylic acid and uracil-4-carboxylic acid and their non-toxic salts or lower alkyl esters. These compositions are effective in providing a nonspecific activity against virus warts, Molluscum contagiosum, Condylomata acuminata, Herpes simplex, and Herpes zoster.

3,608,080

PROCESS FOR THE TREATMENT OF HYPERURIMIA OF NEPHRITIS

Francis Albert Kirsch, 64, Rue de Prony, 75 Paris, France

Filed Mar. 18, 1968, Ser. No. 713,802
Claims priority, application France, Mar. 20, 1967, 99,444
Int. Cl. A61k *27/00*
U.S. Cl. 424—253 **1 Claim**



Process for the treatment of hyperuremia of nephritis comprising administering to a patient 2–30 grams per 24 hours of sarcosyluric acid.

3,608,081

METHOD OF TREATING PSEUDOMONAS INFECTIONS

Raymond Curry Erickson, Metuchen, and Gennaro John Miraglia, East Brunswick, both of N.J., assignors to E. R. Squibb & Sons, Inc., New York, N.Y.

Filed Nov. 17, 1969, Ser. No. 877,479
Int. Cl. A61k *21/00*
U.S. Cl. 424—271 **5 Claims**

A particularly effective method of treating infections caused by Pseudomonas organisms is by treatment with 6-(α-ureidophenyacetamido) penicillanic acid or a salt or lower alkyl ester thereof.

3,608,082

METHOD OF TREATING FUNGUS INFECTIONS WITH 2-AMINO-5-(1-METHYL-5-NITRO-2-IMIDAZOLYL)-1,3,4-OXADIAZOLE

Gunnar Sigurd Redin, New City, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed June 23, 1969, Ser. No. 835,799
Int. Cl. A61k *27/00*
U.S. Cl. 424—272 **2 Claims**

The method of use and compositions containing 2-amino-5-(1-methyl-5-nitro-2-imidazoles)-1,3,4-oxadiazoles in warmblooded animals, is described. This compound is useful as an antifungal agent.

3,608,083

VITAMIN E POWDER

Raymond Howard Bunnell, Branchville, and Marco Alfred Cannalonga, Fort Lee, both of N.J., assignors to Hoffmann La Roche Inc., Nutley, N.J.

Filed June 5, 1968, Ser. No. 734,540
Int. Cl. A61k *15/10*
U.S. Cl. 424—284 **4 Claims**

High potency vitamin E powders, suitable for use in tablets and capsules are produced by spray drying an emulsion of a

vitamin E active compound and a gelatin hydrolysate having very low Bloom.

3,608,084

HALOGENATED ALIPHATIC NITRILES FOR CONTROLLING THE GROWTH OF AEROBACTER BACTERIA IN INDUSTRIAL WATER SYSTEMS

Joseph Matt, Chicago, Ill., assignor to Nalco Chemical Company, Chicago, Ill.

Filed June 19, 1968, Ser. No. 738,120
Int. Cl. A01n 9/20
U.S. Cl. 424—304 7 Claims

The growth and reproduction of Aerobacter bacteria in industrial aqueous systems is prevented by treating such systems with small amounts of certain halogenated aliphatic nitriles.

3,608,085

GRAIN PRESERVATIVE COMPOSITION AND A METHOD OF USING THE SAME

Thomas H. Papworth, New Orleans, La., assignor to Grain Conditioners, Inc., New Orleans, La.

Filed Jan. 18, 1967, Ser. No. 610,029
Int. Cl. A01n 9/02, 9/24
U.S. Cl. 424—317 2 Claims

A grain preservative means and method is provided for preserving stored grain for long periods of time. The preservative comprises at least one of a fatty acid, an anhydride of a fatty acid or an aldehyde of a fatty acid in combination with at least one chlorine substituted methane or ethane compound.

3,608,086

TREATMENT OF DERMATOLOGIC DISEASES EMPLOYING ALUMINUM PROPIONATE ALUMINUM DIPROPIONATE AND CERTAIN DOUBLE ACID SALTS THEREOF

Alfred Halpern, Great Neck, N.Y., assignor to Synergistics, Yonkers, N.Y.

Division of Ser. No. 683,415, June 27, 1967, Pat. No. 3,449,391, which is a continuation-in-part of application Ser. No. 287,170, May 24, 1963, now abandoned, which is a continuation-in-part of application Ser. No. 108,809, May 9, 1961, now abandoned. Divided and this application Nov. 1, 1968, Ser. No. 795,131
Int. Cl. A61k 27/00
U.S. Cl. 424—317 19 Claims

Double acid salts of aluminum propionate and aluminum dipropionate prepared with acetic acid, lactic acid, citric acid and tartaric acid, which are suitable for use in treating dermatologic disease.

3,608,087

FEED COMPOSITIONS

Arthur A. Patchett; Dale R. Hoff, Cranford, N.J., and Clarence S. Rooney, Beaconsfield, Quebec, Canada, assignors to Merck & Co. Inc., Rahway, N.J.

Filed June 21, 1968, Ser. No. 738,801
Int. Cl. A61k 27/00
U.S. Cl. 424—320 5 Claims

The disclosure relates to methods and compositions for controlling the formation of methane in rumen fermentation through the use of compounds containing halogen bonded to carbon which is in turn attached directly to a functional group. Preferred compounds are amides, alcohols, ketones, sulfones, sulfoxides, carboxylic acids, amines, sulfonamides and phosphonic acid derivatives. The disclosure also relates to novel compounds including N-(2-hydroxypropyl) derivatives of di- and trihaloamides and the N-(2-hydroxyethyl) derivatives of trihaloacetamides.

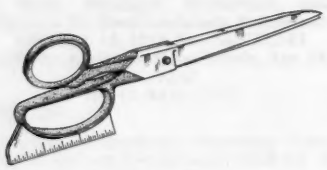
DESIGNS

SEPTEMBER 21, 1971

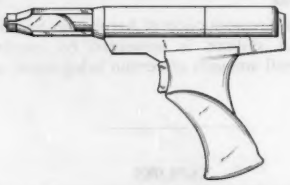
221,923
DIVER'S HELMET
Richard F. Jones, Santa Barbara, Calif., assignor to Agonie Engineering, Santa Barbara, Calif.
Filed June 15, 1970, Ser. No. 23,496
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—231

221,924
HOUSING FOR AUTOMATIC TOOTHBRUSH OR THE LIKE
Salvatore P. Aurelio, Chicago Heights, and Efrem M. Ostrowsky, Highland Park, Ill., assignors to Sona Stream Corporation, Peotone, Ill.
Filed Mar. 20, 1970, Ser. No. 21,996
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—16

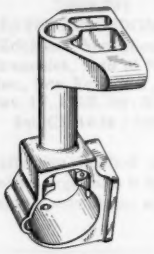
221,925
COMBINED SHEARS AND MEASURING RULE
Walter K. Fogg, 45 Kensington St., Feeding Hills, Mass. 01030
Filed June 3, 1970, Ser. No. 23,291
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—55



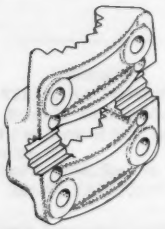
221,926
STRAP APPLYING TOOL
Paul Farkas, Fair Lawn, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.
Filed July 7, 1970, Ser. No. 23,852
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—68



221,927
SUPPORT BRACKET FOR AUTOMOBILE THEFT GUARD
Lucien Charles Hippolyte Juy, 75 Rue General Fauconnet, Dijon, France
Filed July 30, 1969, Ser. No. 18,469
Claims priority, application France Apr. 8, 1969
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—113

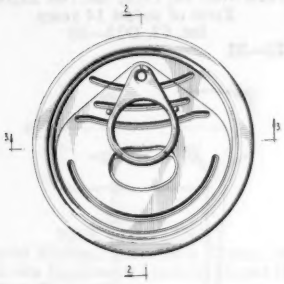


221,928
ANTENNA MOUNTING BRACKET
Bruno Zucconi, Alameda, Calif. (1970 Republic Ave., San Leandro, Calif. 94577)
Filed Oct. 23, 1969, Ser. No. 19,681
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—234



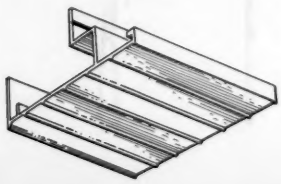
221,929
CLOTHES HANGER SUPPORT FOR AN AUTOMOBILE
Richard N. Allen, 2809 Cherokee Ave., Columbus, Ga. 31906
Filed Apr. 27, 1970, Ser. No. 22,679
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—246

221,930
END CLOSURE FOR A CONTAINER
William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation
Filed Sept. 18, 1970, Ser. No. 25,059
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—255



221,931
CONTAINER CLOSURE
Ralph V. Bardell, deceased, late of Homewood, Ill., by Mary G. Bardell, executor, Homewood, Ill.
Filed Apr. 28, 1970, Ser. No. 22,694
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—267

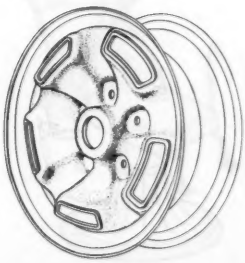
221,932
EXTRUDED FASCIA MEMBER
Irvine Kimmel, 2375 NW. 75th St., Miami, Fla. 33147
Filed Aug. 17, 1970, Ser. No. 24,544
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1



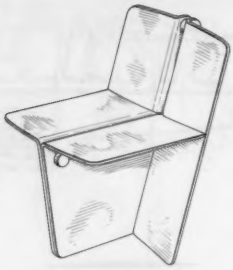
221,933
MOTOR HOME BODY
Stanley A. McKenney II, Tulsa, Okla., assignor to Avco Corporation, Tulsa, Okla.
Filed May 6, 1970, Ser. No. 22,839
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D14—3

221,934
WHEEL
John A. Main, East Lansing, and Millard F. Harty, Jr., Bloomfield Hills, Mich., assignors to Motor Wheel Corporation, Lansing, Mich.
Filed Apr. 23, 1970, Ser. No. 22,592
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D14—30

221,935
WHEEL
Millard F. Harty, Jr., Bloomfield Hills, Mich., assignor to Motor Wheel Corporation, Lansing, Mich.
Filed May 26, 1970, Ser. No. 23,160
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D14—30



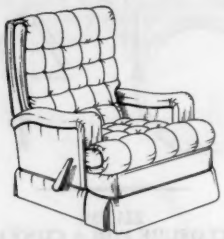
221,936
CHAIR
Jeffery R. Fear, 473 Brunswick Ave., Toronto 4, Ontario, Canada
Filed Apr. 8, 1970, Ser. No. 22,330
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—1



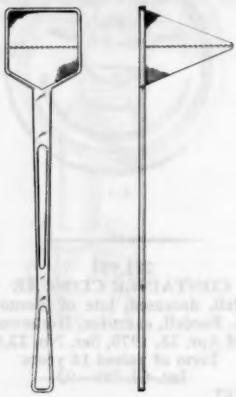
221,937
CHAIR OR SIMILAR ARTICLE
Sidney Gibson, Suite 110, 57 Godstone Road, Willowdale, Ontario, Canada
Filed Apr. 8, 1970, Ser. No. 22,331
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—1

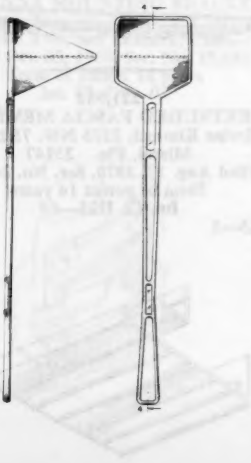
221,938
EXAMINATION TABLE
Anthony D. Valente, 5 Cedar Court, Copiague, N.Y. 11726
Filed Jan. 14, 1970, Ser. No. 20,911
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—3

221,939
CHAIR
Morris F. Fisher, Carmel, Ind., assignor to Mohasco Industries, Inc., Amsterdam, N.Y.
Filed Nov. 21, 1969, Ser. No. 20,219
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—11

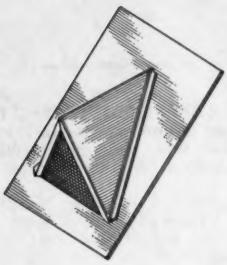


221,940
FISH NET
Monte L. Levin, New York, N.Y., assignor to Metaframe Corporation, Maywood, N.J.
Filed Mar. 18, 1970, Ser. No. 21,944
Term of patent 14 years
Int. Cl. D22—*08*
U.S. Cl. D22—22

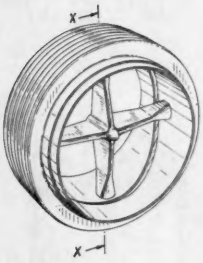




221,941
COMBINED PIPE FLASHING AND SNOW DEFLECTOR UNIT OR SIMILAR ARTICLE
Herman G. Murphy, P.O. Box 446, Incline Village, Nev. 89450
Filed Apr. 8, 1970, Ser. No. 22,311
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—42



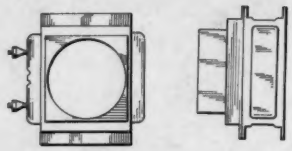
221,942
PIPE COUPLING
Horace Percival Halling, Leverstock Green, England, assignor to Avica Equipment Limited, Hemel Hempstead, Hertfordshire, England
Filed July 7, 1969, Ser. No. 18,064
Claims priority, application Great Britain Jan. 8, 1969
Term of patent 7 years
Int. Cl. D23—*01*
U.S. Cl. D23—43



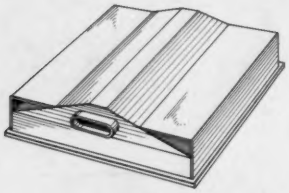
221,943
SHOWER STALL
Merritt W. Seymour, Toledo, Ohio, assignor to Owens-Corning Fiberglas Corporation
Original design application Mar. 29, 1968, Ser. No. 11,199, now Patent No. 215,289, dated Sept. 23, 1969. Divided and this application Oct. 11, 1968, Ser. No. 14,373
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—57

221,944
ANDIRON OR THE LIKE
Carl Coleman Strickland, Wendell, N.C. 27591
Filed Jan. 30, 1970, Ser. No. 21,168
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—102

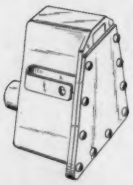
221,945
HEAT EXCHANGER
Mario L. Carangelo, North Haven, Conn., assignor to The G & O Manufacturing Company, New Haven, Conn.
Filed Nov. 20, 1969, Ser. No. 20,207
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



221,946
COMBINED LIGHTING AND VENTILATING FIXTURE
Robert E. Garrett and Leon D. Dame, both of 1544 W. 8th St., Los Angeles, Calif. 90017
Filed Mar. 23, 1970, Ser. No. 22,005
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—140

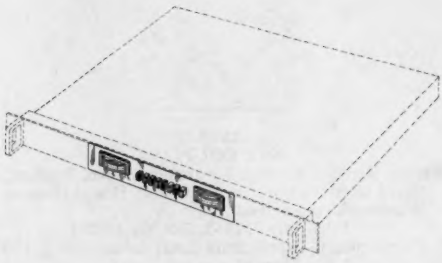


221,947
PESTICIDE VAPORIZER
Edward C. Geiger, 500 E. 7th St., Lansdale, Pa. 19446
Filed Feb. 20, 1970, Ser. No. 21,557
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—148



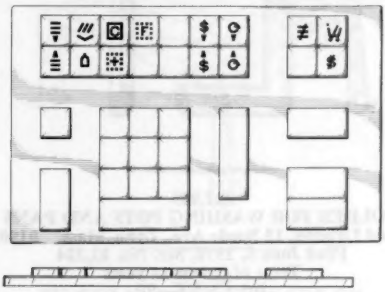
221,948
DENTAL FLOSS HOLDER
Thomas P. Centofanti, 15631 Fairfield, Livonia, Mich. 48154
Filed Mar. 6, 1970, Ser. No. 21,764
Term of patent 7 years
Int. Cl. D24—*03;* D4—*02*
U.S. Cl. D24—1

221,949
POWER SUPPLY METERING PANEL
Edward Brenner, Commack, Marvin Price, South Ozone Park, and Benjamin Shmurak, Lynbrook, N.Y., assignors to Lambda Electronics Corporation, Huntington, N.Y.
Filed Nov. 3, 1970, Ser. No. 25,797
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D26—1

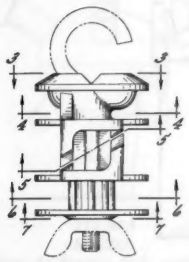


221,950
HOUSING FOR A VEHICLE IGNITION SYSTEM
Paul F. Eidinger, 2923 Florence St., Berkeley, Calif. 94705
Filed Mar. 19, 1970, Ser. No. 21,974
Term of patent 14 years
Int. Cl. D13—*99*
U.S. Cl. D26—5

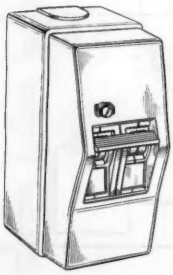
221,951
KEYBOARD FOR A COMPUTER OR SIMILAR ARTICLE
James Thomas Kindley, Maple Shade, N.J., assignor to RCA Corporation
Continuation-in-part of design application Ser. No. 20,662, Dec. 29, 1969. This application May 19, 1970, Ser. No. 23,059
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5



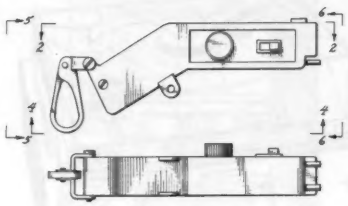
221,952
ELECTRIC FENCE INSULATOR
Fredric C. Muntwyler, Sr., Palos Park, Ill., assignor to Wire Machinery Inc., Chicago, Ill.
Filed Nov. 4, 1969, Ser. No. 19,943
Term of patent 14 years
Int. Cl. D13—*99*
U.S. Cl. D26—10



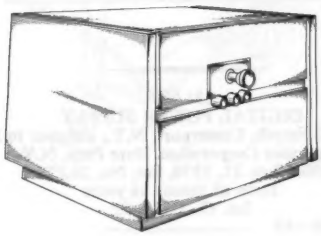
221,953
CIRCUIT BREAKER OR THE LIKE
Giuseppe Zecca, Via Monte Tabor 16, Varese, Italy
Filed June 16, 1970, Ser. No. 23,520
Claims priority, application Italy Jan. 10, 1970
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13

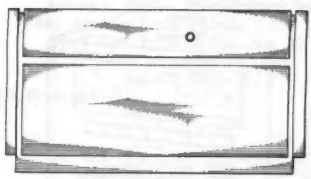


221,954
AUDIO AMPLIFIER FOR TELEPHONE HANDSET
John A. Stratman, West Hollywood, Fla., assignor to Lumidor Products Corporation, Miami, Fla.
Filed Nov. 12, 1969, Ser. No. 20,036
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14

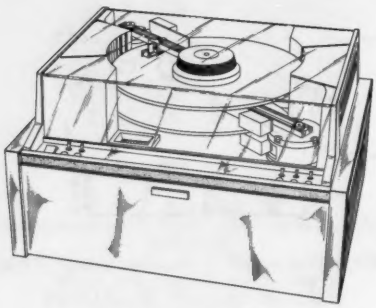


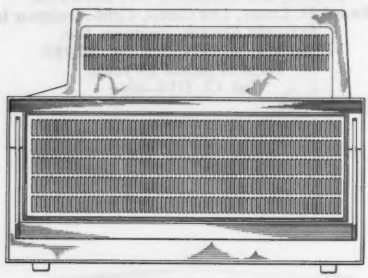
221,955
LASER OR SIMILAR APPARATUS
Edward D. Lucey, Los Gatos, Calif., assignor to Sylvania Electric Products, Inc.
Filed May 4, 1970, Ser. No. 22,989
Term of patent 14 years
Int. Cl. D14—*04*
U.S. Cl. D26—14



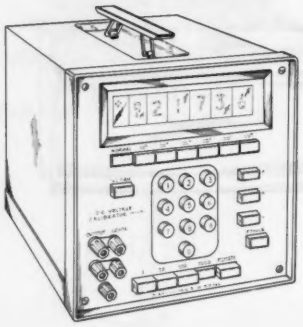


221,956
MAGNETIC DISC TRANSDUCING MACHINE
Hari Matsuda, Evanston, Ill., and Robert W. Bornschlegel, Mountain View, Calif., assignors to Ampex Corporation, Redwood City, Calif.
Filed May 4, 1970, Ser. No. 22,790
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14

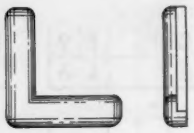




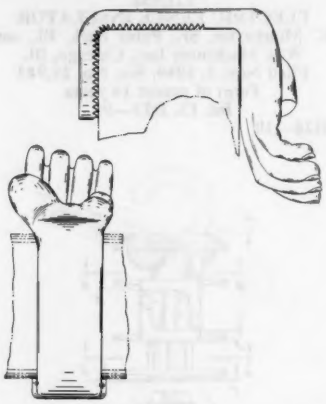
221,957
DIGITAL POWER SUPPLY
Robert E. C. Smyth, Centerport, N.Y., assignor to Digital Apparatus Corporation, Deer Park, N.Y.
Filed Jan. 12, 1970, Ser. No. 20,873
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D26—15



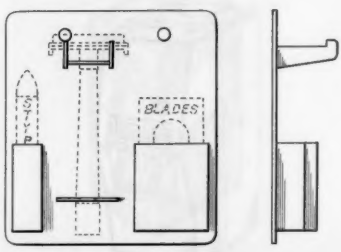
221,958
CORNER GUARD FOR FURNITURE OR THE LIKE
Benjamin Finebaum, Memphis, Tenn., assignor to Creativity Unlimited Corp., Memphis, Tenn.
Filed Mar. 17, 1969, Ser. No. 16,262
Term of patent 3½ years
Int. Cl. D6—*99*
U.S. Cl. D33—1



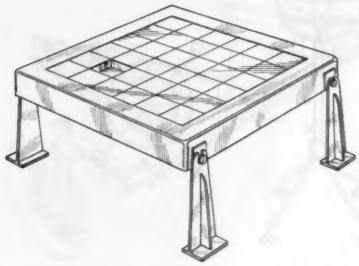
221,959
HOLDER FOR WASHING POTS AND PANS
David Liftman, 15 Beede Ave., Lynn, Mass. 01902
Filed June 5, 1970, Ser. No. 23,324
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D33—17



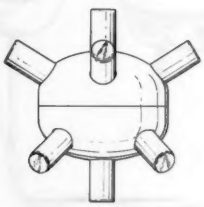
221,960
SHAVING CADDY
John C. Stephenson, 1257 Armacost Ave., Los Angeles, Calif. 90025
Filed Apr. 13, 1970, Ser. No. 22,415
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D33—23



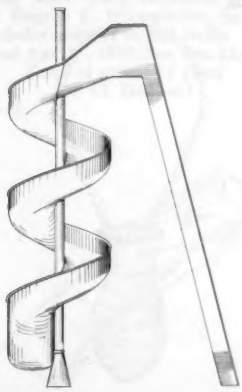
221,961
GAME BOARD
Joseph E. Mitchell, 435 Orleana Ave., Long Beach, Calif. 90814
Filed Apr. 7, 1969, Ser. No. 16,612
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5



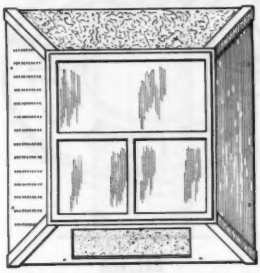
221,962
FINGER MANIPULATIVE TOY OR SIMILAR ARTICLE
Jorma Vennola, Helsinki, Finland, assignor to Trendon Limited, Old Malton, England
Filed Oct. 10, 1969, Ser. No. 19,505
Claims priority, application Great Britain June 16, 1969
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5



221,963
SLIDE
Steven A. Henning, Anderson, Ind., assignor to American Playground Device Co., Anderson, Ind.
Filed Apr. 23, 1970, Ser. No. 22,610
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5

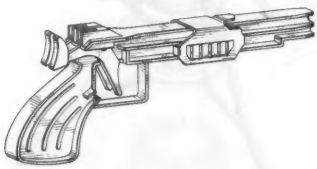


221,964
CHILD'S PLAY CHEST
Merrill L. Hassenfeld, Providence, R.I., assignor to Hasbro Industries, Inc., Pawtucket, R.I.
Filed Mar. 16, 1970, Ser. No. 21,924
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15

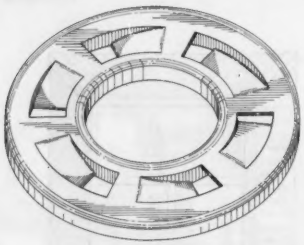


221,965
SCOOTER
Francis C. La Jeunesse, 1196 Boulevard Way, Walnut Creek, Calif. 94595
Filed Mar. 18, 1970, Ser. No. 21,961
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D34—15

221,966
TOY GUN
James L. Howe, Temperance, Mich. (7485 Apache Trail, Toledo, Ohio 43612)
Filed Apr. 1, 1970, Ser. No. 22,167
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15

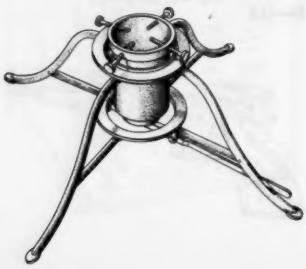


221,967
CIRCULAR BOOMERANG
William G. Sheard, 29295 Lansing Drive, Westlake, Ohio 44145
Filed May 8, 1970, Ser. No. 22,884
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15

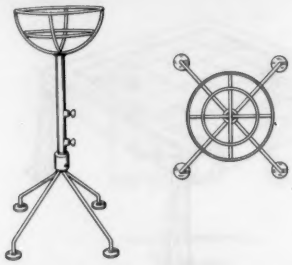


221,968
VISUAL DISPLAY TOY
Robert Fieldhouse, Bramhope, near Leeds, England, assignor to Denys Fisher Toys Limited, Boston Spa, Yorkshire, England
Filed June 25, 1970, Ser. No. 23,657
Claims priority, application Great Britain May 6, 1970
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15

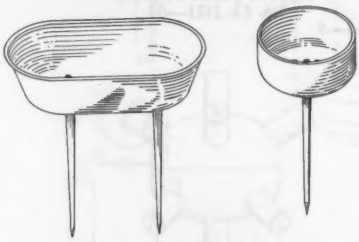
221,969
CHRISTMAS TREE STAND
Robert W. De Vries, Grand Rapids, Mich., assignor to Wolverine Industries, Inc., Grand Rapids, Mich.
Filed Mar. 30, 1970, Ser. No. 22,096
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3



221,970
EXTENSIBLE FLOWER STAND
Samuel P. Kelly, 806 Grand Ave., Fort Worth, Tex. 76106
Filed Aug. 28, 1970, Ser. No. 24,743
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3

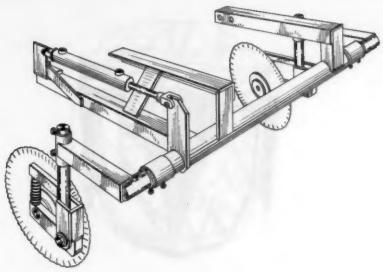


221,971
FLOWER URN
Charles J. Terrell, 740 Van Deman St., Washington Court House, Ohio 43160
Filed Sept. 3, 1970, Ser. No. 24,827
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D35—3

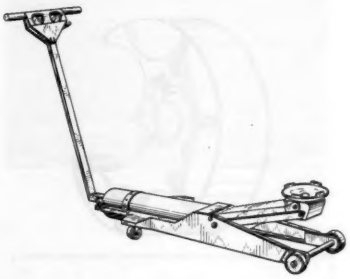


221,972
COMBINED TUMBLER AND SUPPORTING NECKLACE THEREFOR
Edward T. Kennedy, Wheeling, W. Va., assignor to Fostoria Glass Company, Moundsville, W. Va.
Continuation-in-part of design application Ser. No. 19,668, Oct. 22, 1969. This application June 9, 1970, Ser. No. 23,389
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D36—8

221,973
PFANUT VINE CUTTER OR THE LIKE
Louis C. Johnson, Box 49, Pendleton, N.C. 27862
Filed Sept. 8, 1969, Ser. No. 19,051
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D40—1



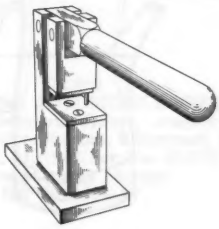
221,974
VEHICLE LIFT
Gary L. Kincaid, St. Joseph, Mo., assignor to Gray Manufacturing Company, Inc., St. Joseph, Mo.
Filed Mar. 23, 1970, Ser. No. 22,025
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D41—1



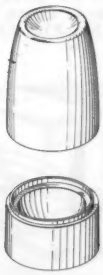
221,975
CAR WHEEL SUPPORT
Guy I. Nellis, 4861 Cale Redonda, Phoenix, Ariz. 85018, and Eugene E. Wiesenhofer, Scottsdale, Ariz.; said Wiesenhofer assignor to said Nellis
Filed Apr. 15, 1970, Ser. No. 22,440
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D41—1

221,976
TIMER
Larry G. Stolarczyk, Raton, N. Mex., assignor to A.R.F. Products, Incorporated, Raton, N. Mex.
Filed Jan. 26, 1970, Ser. No. 21,072
Term of patent 14 years
Int. Cl. D10—*03*
U.S. Cl. D42—7

221,977
NUTCRACKER
Maurice M. Pike, 1827 E. Home Ave., Fresno, Calif. 93703
Filed July 15, 1970, Ser. No. 23,959
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D44—1

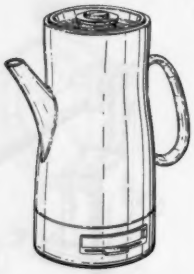


221,978
EGG CUP
Robert Daenen, Erembodegem, Belgium, and James B. Swett, Barrington, R.I., assignors to Dart Industries, Inc., Los Angeles, Calif.
Filed May 1, 1970, Ser. No. 22,771
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D44—9

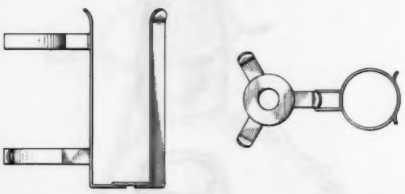


221,979
CHAFING DISH
Alfred W. Madl, Glendale, Wis., assignor to John Oster Manufacturing Co., Milwaukee, Wis.
Filed July 15, 1970, Ser. No. 23,957
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D44—15

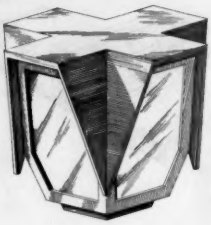
221,980
PERCOLATOR
John Armstrong, Watford, England, assignor to British Domestic Appliances Limited, Peterborough, England
Filed Dec. 22, 1969, Ser. No. 20,757
Claims priority, application Great Britain June 20, 1969
Term of patent 3½ years
Int. Cl. D7—*02*
U.S. Cl. D44—26



221,981
CANDLE HOLDER
William R. Small, Santa Fe Springs, Calif., assignor of fractional part interest to Edna Mildred Small, Santa Fe Springs, Calif.
Filed Jan. 30, 1970, Ser. No. 21,159
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—2

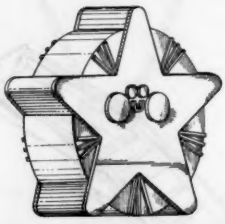


221,982
LIGHTING FIXTURE
Robert H. R. Little, Gettysburg, Pa., assignor to Hadco Products, Inc., Littlestown, Pa.
Filed July 24, 1970, Ser. No. 24,106
Term of patent 14 years
Int. Cl. D26—*02, 03*
U.S. Cl. D48—4

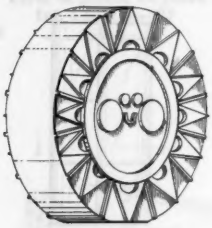


221,983
TABLE LAMP
Donald R. Kracke, 5620 Whitecliff Drive, Palos Verdes Peninsula, Calif. 90274
Filed July 27, 1970, Ser. No. 24,142
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20

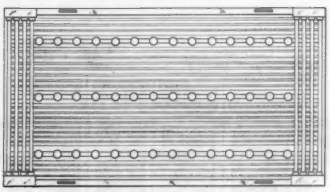
221,984
TABLE LAMP
Donald R. Kracke, 5620 Whitecliff Ave., Palos Verdes Peninsula, Calif. 90274
Filed July 27, 1970, Ser. No. 24,145
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20



221,985
TABLE LAMP
Donald R. Kracke, 5620 Whitecliff Drive, Palos Verdes Peninsula, Calif. 90274
Filed July 27, 1970, Ser. No. 24,146
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20

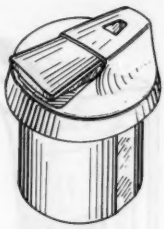


221,986
LIGHTING FIXTURE
Richard H. Taylor, Winnipeg, Manitoba, Canada, assignor to Controlled Environments Ltd., Winnipeg, Manitoba, Canada
Filed Nov. 17, 1969, Ser. No. 20,140
Claims priority, application Canada Oct. 10, 1969
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23

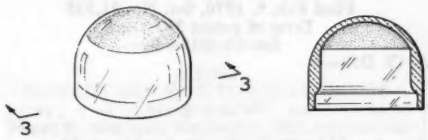


221,987
COFFEE MAKER
Gene Schugart, Chicago, and Richard B. Hall, Glen Ellyn, Ill., assignors to Sunbeam Corporation, Chicago, Ill.
Filed July 6, 1970, Ser. No. 23,836
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D44—26

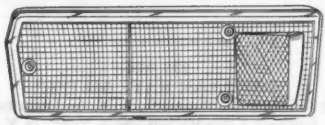
221,988
CIGARETTE LIGHTER
David Eberhart, Bound Brook, N.J., assignor to Ronson Corporation, Woodbridge, N.J.
Filed May 20, 1970, Ser. No. 23,094
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D48—27



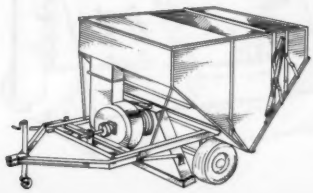
221,989
LENS FOR BOAT ANCHOR LIGHT
Hugo Magi, Etobicoke, Ontario, Canada, assignor to Aqua-Marine Mfg. Limited, Toronto, Ontario, Canada
Filed Mar. 10, 1969, Ser. No. 16,161
Term of patent 14 years
Int. Cl. D12—*99*
U.S. Cl. D48—32



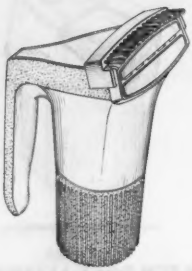
221,990
TAIL LAMP FOR AUTOMOBILE VEHICLES
Michel Tixier, Billancourt, France, assignor to Regie Nationale des Usines Renault, Billancourt, France
Filed Oct. 31, 1969, Ser. No. 19,875
Term of patent 14 years
Int. Cl. D12—*99*
U.S. Cl. D48—32



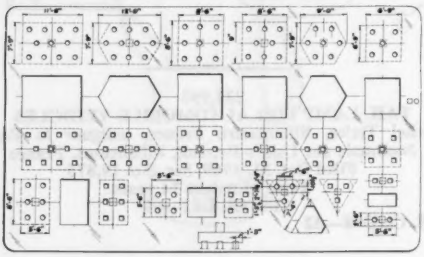
221,991
TURF VACUUMING DEVICE
William S. Jensen, Rolling Hills Estates, Calif., assignor to Turf-Vac Corporation, Long Beach, Calif.
Filed Jan. 26, 1970, Ser. No. 21,097
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D49—9.1



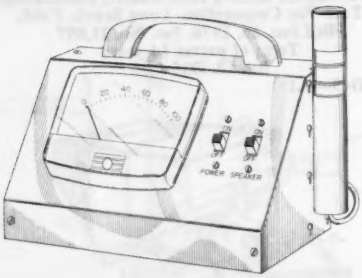
221,992
STEAM GENERATING APPLIANCE
Bernard B. Bluestein, Des Plaines, and Douglas G. Long, Lombard, Ill., assignors to Sunbeam Corporation, Chicago, Ill.
Filed July 13, 1970, Ser. No. 23,919
Term of patent 14 years
Int. Cl. D7—*05;* D15—*05*
U.S. Cl. D49—13



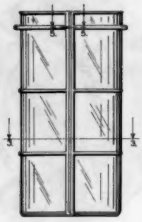
221,993
PILECAP TEMPLATE
Robert J. Crawford, 7019 Altair Parkway, Sacramento, Calif. 95823
Filed Feb. 9, 1970, Ser. No. 21,335
Term of patent 3½ years
Int. Cl. D10—*99*
U.S. Cl. D52—6



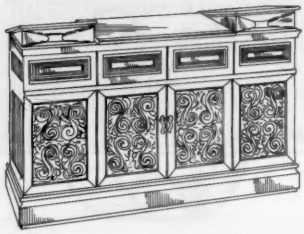
221,994
NUCLEAR RATE METER
Wayne J. Gemmill, Warwick, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
Filed Mar. 12, 1970, Ser. No. 21,869
Term of patent 14 years
Int. Cl. D10—*11*
U.S. Cl. D52—6



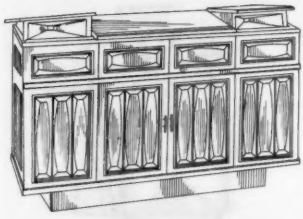
221,995
MOLD FOR TEST CYLINDERS
James W. Rudicil, 504 S. 15th St., Blue Springs, Mo.
Filed May 13, 1970, Ser. No. 22,957
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D54—8



221,996
CABINET FOR A STEREO PHONOGRAPH OR SIMILAR ARTICLE
Daniel J. Domin, Deerfield, and Thomas E. Duvall, Morton Grove, Ill., assignors to TMA Company, Wheeling, Ill.
Filed Aug. 10, 1970, Ser. No. 24,412
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4



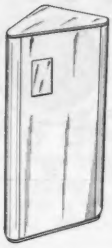
221,997
CABINET FOR A STEREO PHONOGRAPH OR SIMILAR ARTICLE
Daniel J. Domin, Deerfield, and Thomas E. Duvall, Morton Grove, Ill., assignors to TMA Company, Wheeling, Ill.
Filed Aug. 10, 1970, Ser. No. 24,413
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4



221,998
COMBINED RECORD PLAYER AND RADIO-AMPLIFIER OR SIMILAR ARTICLE
Hideo Wada, Chigasaki, Sukeyoshi Nashinoki, Yokohama, and Itsuo Kato and Tsutomu Murakami, Tokyo, Japan; said Nashinoki and Kato assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Sept. 14, 1970, Ser. No. 24,960
Claims priority, application Japan Mar. 13, 1970
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4

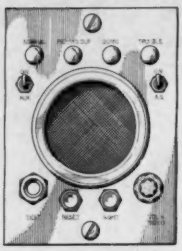
221,999
FILM CASSETTE
Max Steinberg, Lake Success, Arthur Elian, Great Neck, Louis Verrone, Pearl River, and Roger Klingenberg, Stony Point, N.Y., assignors to Apex Phototletter Composing, Inc., Great Neck, N.Y.
Filed June 29, 1970, Ser. No. 23,704
Term of patent 14 years
Int. Cl. D16—*99*; D14—*02*
U.S. Cl. D61—1

222,000
SAFE FOR VALUABLES OR THE LIKE
Marco Zanuso, Milan, Italy, assignor to Parma Antonio & Figli S.A.S., Saronno, Varese, Italy
Filed Apr. 28, 1970, Ser. No. 22,687
Claims priority, application Italy Jan. 23, 1970
Term of patent 3½ years
Int. Cl. D31
U.S. Cl. D69—1

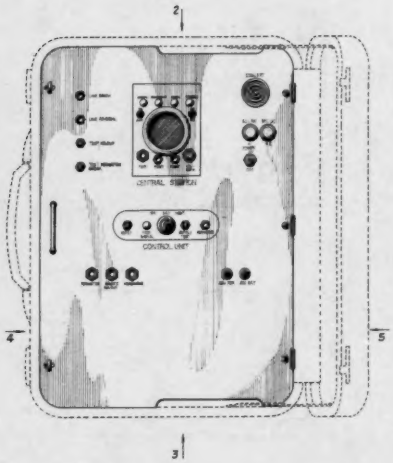


222,001
SUPPORT HOUSING FOR ELECTRONIC ALARM UNIT
James F. Pinkham, Kensington, Md., assignor to Multra-Guard, Inc., Rockville, Md.
Filed Feb. 5, 1970, Ser. No. 21,294
Term of patent 14 years
Int. Cl. D29—*99*
U.S. Cl. D72—1

222,002
SUPPORT HOUSING FOR SECURITY ALARM UNIT
James F. Pinkham, Kensington, Md., assignor to Multra-Guard, Inc., Rockville, Md.
Filed Feb. 5, 1970, Ser. No. 21,295
Term of patent 14 years
Int. Cl. D29—*99*
U.S. Cl. D72—1

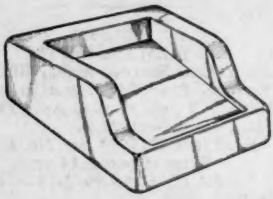


222,003
INDICATOR PANEL FOR A SECURITY ALARM SYSTEM PORTABLE DEMONSTRATOR UNIT
James F. Pinkham, Kensington, Md., assignor to Multra-Guard, Inc., Rockville, Md.
Filed Feb. 5, 1970, Ser. No. 21,296
Term of patent 14 years
Int. Cl. D29—*99*
U.S. Cl. D72—1



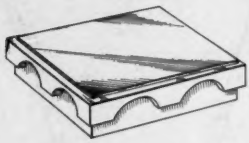
222,004
HOLDER FOR MEMOS, CARDS OR THE LIKE
Venita R. Jensen, 9110 Rayford Ave., Los Angeles, Calif. 90045
Filed Jan. 30, 1970, Ser. No. 21,167
Term of patent 7 years
Int. Cl. D19—*02*
U.S. Cl. D74—1

222,005
COMBINED ARMREST AND TRAY FOR PASSENGER PLANES
Arthur F. Kelly, Los Angeles, Calif., assignor to Western Air Lines, Inc., Los Angeles, Calif.
Filed Jan. 23, 1970, Ser. No. 21,055
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—1

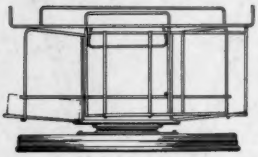


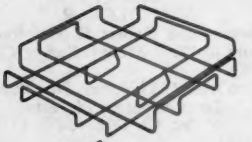
222,006
END CLOSURE FOR A NEWSPAPER DELIVERY TUBE
Paul H. Pennell, North Jackson, Ohio, assignor to Elastomeric Products Inc., North Jackson, Ohio
Filed May 6, 1970, Ser. No. 22,830
Term of patent 14 years
Int. Cl. D31
U.S. Cl. D74—9

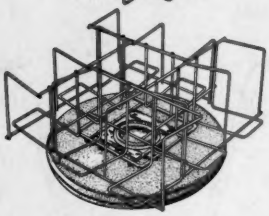
222,007
PILLOW DISPLAY STAND
James T. Peterson, Prospect Heights, Ill., assignor to Mohasco Industries, Inc., Amsterdam, N.Y.
Filed Dec. 15, 1969, Ser. No. 20,490
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D80—9



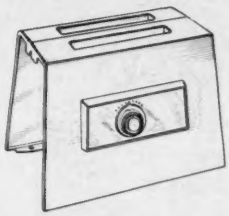
222,008
ROTATABLE STORAGE AND DISPLAY STAND FOR TAPE OR FILM CARTRIDGES OR THE LIKE
Henry V. Ivory, Chatham, N.J., assignor to Boorum & Pease Company, Brooklyn, N.Y.
Filed Nov. 3, 1969, Ser. No. 19,906
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D80—10



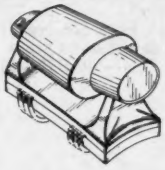


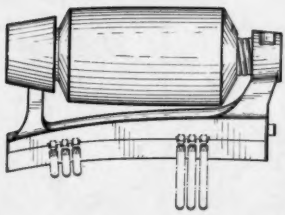


222,009
TOASTER SHELL
John E. Reed, Glen Ellyn, and Julian R. Haynes, Hinsdale, Ill., assignors to Sunbeam Corporation, Chicago, Ill.
Filed Oct. 14, 1969, Ser. No. 19,550
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D81—10

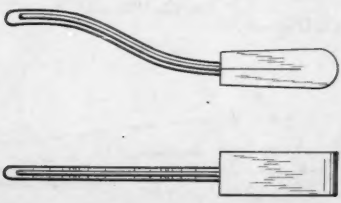


222,010
HOUSING FOR A MASSAGER
Alfred W. Madl, Glendale, Wis., assignor to John Oster Manufacturing Co., Milwaukee, Wis.
Filed July 16, 1970, Ser. No. 23,979
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1

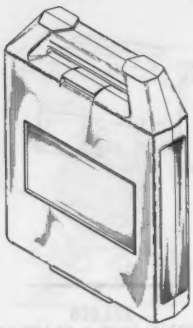




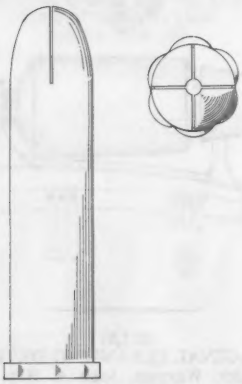
222,011
VAGINAL CLEANSING DEVICE
John B. Fansler, Wayzata, John A. Hay, Maple Plain, Patrick J. Kelley, Eden Prairie, and Glen J. Einess, Minneapolis, Minn., assignors to Fuller Laboratories Inc., Eden Prairie, Minn.
Filed Apr. 22, 1970, Ser. No. 22,562
Term of patent 14 years
Int. Cl. D24—*99*; D7—*99*
U.S. Cl. D83—12



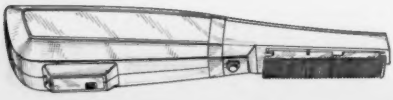
222,012
MAGNETIC TAPE REEL CASE
James E. Harris, Auburn, Ala., assignor to Ampex Corporation, Redwood City, Calif.
Filed June 19, 1970, Ser. No. 23,569
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1



222,013
OUTER TUBE FOR A TAMPON INSERTER
Alfred R. Thomas, Wyoming, and Darrel D. Koxx, Greenhills, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 18, 1970, Ser. No. 21,492
Term of patent 14 years
Int. Cl. D24—*99*; D28—*01*
U.S. Cl. D83—12



222,014
ELECTRICALLY HEATED COMB
Norman A. Steinkamp, Chicago Heights, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed July 13, 1970, Ser. No. 23,931
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—8

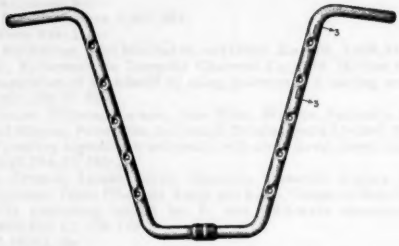


222,015
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,289
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11

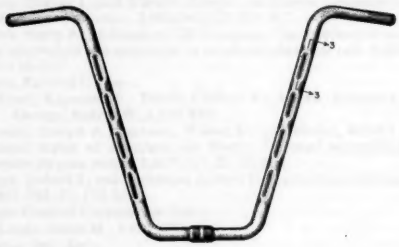
222,016
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,290
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11

222,017
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,291
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11

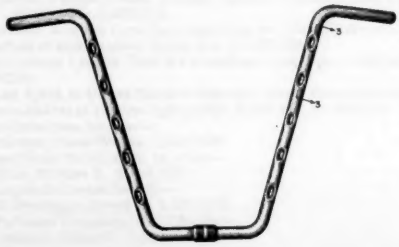
222,018
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,292
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11



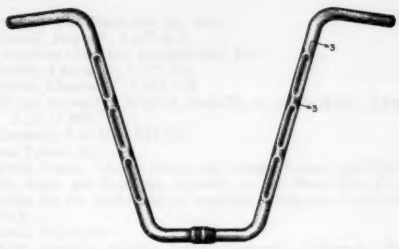
222,019
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,293
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11



222,020
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,294
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11



222,021
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Apr. 6, 1970, Ser. No. 22,295
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—11



222,022
HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
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RACKET
Peter A. Latham, Newburyport, and Paul E. Brefka, Southboro, Mass. (both of 39 Commercial Wharf, Boston, Mass. 02110)
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